The Builder.

VOL. LXVI. No. 2669. MARCH 31, 1894.

ILLUSTRATIONS.

Chimney-piece in Ball-room, Knole House ..... *Double-Page Ink-Photo.*
Principal and West Fronts and North Porch, Audley End ..... *Two Single-Page Ink-Photos.*
The Great Hall and Fireplace, Audley End ..... *Two Single-Page Ink-Photos.*
Details of Metal Work, Tullie House, Carlisle ..... *Double-Page Photo-Litho.*

Blocks in Text.

Ceilings, Audley End ..... Page 248
Plan, Church of St. John, at Damascus ..... Page 249
Plan of Dome-Piers of the Sorbonne Church, showing the Secret Chapels .... Page 253
Diagrams in illustration of "Student's Column" ..... Pages 256, 257

CONTENTS.

Examples of English Renaissance Architecture 247
The Church of St. John at Damascus 249
Notes 250
Further Notes at the Building Exhibition 252
'Secret Chapels" at the Sorbonne 253
Chimney-piece, Knole House 254
Illustrations of Audley End 254
Metal Work, Tullie House, Carlisle 254
Modern Institutions, Asylums, and Hospitals 254
Architectural Societies 254
Competitions 254
Archæological Societies 255
Books: Kelly's "Directory of the Building Trades" and "Directory of the Engineers and Iron and Metal Trades and Colliery Proprietors"; New Directories 255
Which is the Best Brick? 255
"Sandown" Castle 256
Boiler Explosions 256
Student's Column: The Structure and Physical Properties of Building Stones.—XIII. 256
General Building News 25
Sanitary and Engineering News 257
Stained Glass and Decoration 258
Foreign and Colonial 258
Miscellaneous 259
Meetings 259
Recent Patents 259
Some Recent Sales of Property 260
Prices Current of Materials 261
Tenders 261

Examples of English Renaissance Architecture.

ON the appearance of the first portion of Mr. Gotch's book on the "Architecture of the Renaissance in England," three years ago, we devoted some little space to a consideration of the special qualities of the school of architecture illustrated, as well as to the scope and character of the publication itself. The work is now complete in six parts,* and forms a very beautiful collection of picturesque illustrations of this school of architecture, chiefly from the great mansions of which so many were erected in England in that period, which may indeed be called the mansion-building period of English architecture. And though we cannot regard a series of photographic representations as of the same value to architects as a series of measured drawings, we are glad to recognise that in the later parts of the book there has been more attention bestowed on giving plans of the buildings illustrated, a feature which was very deficient in the earlier portion of the work. It is true that the plans given are not on a very large scale or very complete in detail; but we may presume that there is considerable difficulty in obtaining adequate plans of buildings of this class. To be done thoroughly many of them would have to be surveyed afresh, and many owners of mansions in constant occupation would find it inconvenient to give opportunity for the necessary measurements, even if they might not object, on other various grounds, to the publication of the plans of their houses in detail. We must be grateful to the author for what he has been able to give us, although the book may perhaps be regarded in some respects as an album for a general library rather than in a special sense an architect's book.

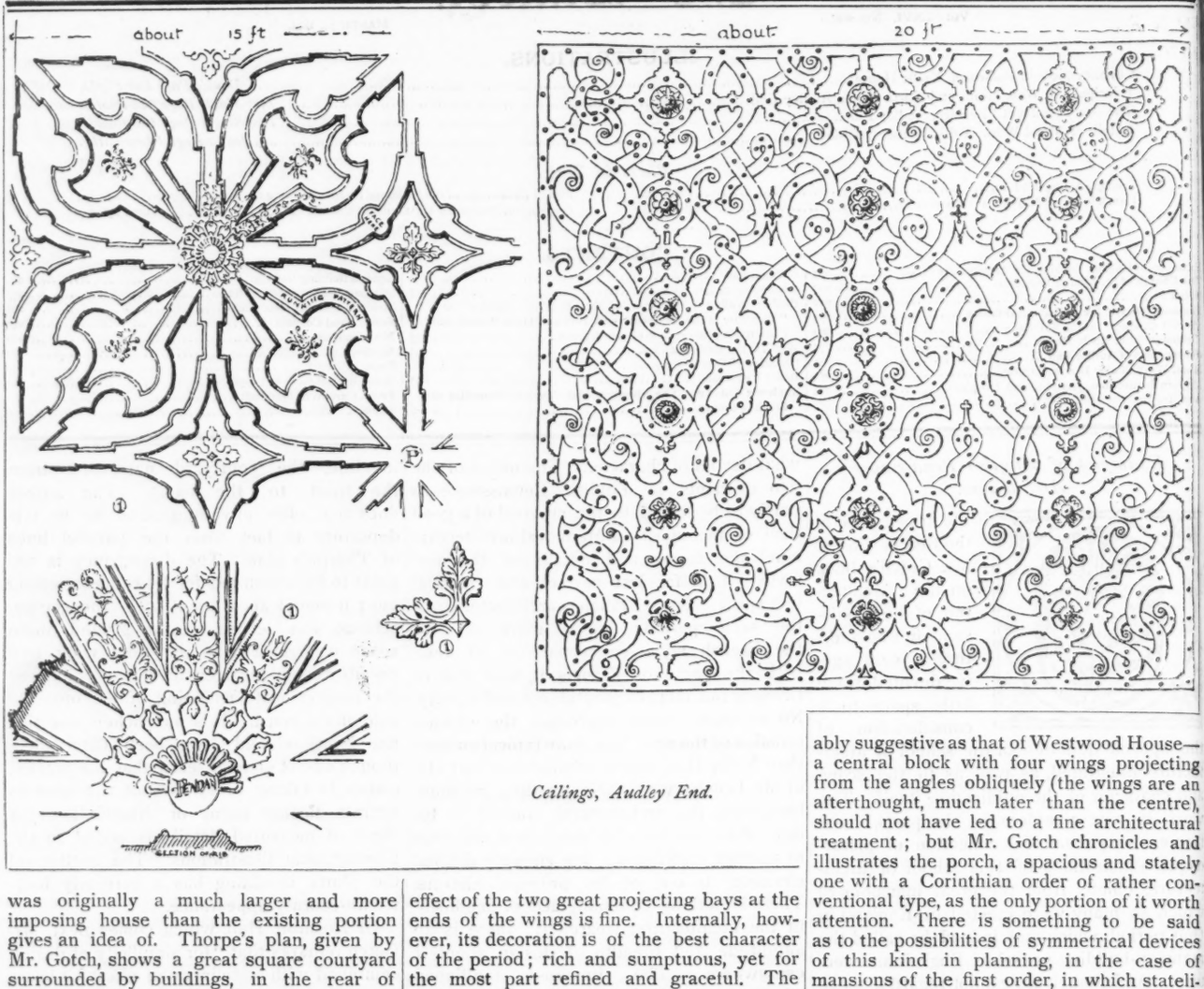
The most distinctive architectural quality of the English Renaissance house may be said to be its combination of dignity with a certain picturesqueness of character; two elements in architectural expression which are not very often found together. Stately and symmetrical buildings are often somewhat devoid of character. The union of the two elements in English Renaissance is partly to be traced to the survival of a good deal of the spirit of Mediæval architecture amid the forms and details of the new style. It is far less correct and classical in spirit than Italian architecture of the same period; it is more akin to the French style connected for all time with the name of Francis I., with less of richness but more of playfulness and variety. No example could represent the characteristics of the style in a more typical manner than Kirby Hall, which commences Part III. of Mr. Gotch's work. No building has more fascinated the architectural student of to-day; there are few who have not at one time or another sketched it. Its strongly defined character is one of its principal charms. There is nothing commonplace or mediocre in the architectural treatment; there is an amplitude and breadth of design about it everywhere. The immense mullioned windows towards the courtyard give it a remarkably palatial and stately expression, and this portion of its architecture is peculiarly interesting also from the boldness in which the Classic order has been treated in a manner which is nevertheless essentially Gothic in feeling and reminiscence. The Classic entablature seems to be represented only by the architrave with a rather unusually bold tenia; for although the face below this moulding is treated decoratively as if it were regarded as a frieze, the whole height of this portion is, in proportion to the scale of the pilasters, only about what would usually be given to the architrave, and above it is only a balustrade wall (not pierced), which seems to play the part of the attic. Hence the pilasters, of considerable projection, appear somewhat like Gothic buttresses, which is really the part they play in the construction, strengthening the piers between the very large mullioned windows. There is no more interesting instance in architecture of this application of Classic detail in an essentially Gothic manner; and it is a curious instance of the whirligig of things in architectural history that this treatment of the pilaster as a buttress, in the sixteenth century, is so exceedingly similar to the application of the pilaster which is found in some Romanesque work, before the Gothic buttress had come into being at all.

Mr. Gotch gives John Thorpe's plan of Kirby, and the plan as existing; the buildings in both being carried round an oblong courtyard, but with the difference that whereas Thorpe's plan shows the sides of the courtyard parallel, in the existing plan one of the long sides is distinctly oblique in line, the courtyard narrowing from the front to the back. The author does not offer any suggestion as to this departure in fact from the parallel lines of Thorpe's plan. The discrepancy is too great to be accounted for by careless setting out; it would seem as if, after the general scheme was settled on the ground, more space was desired in the front wing, and possibly some local circumstances hindered the proportionate widening of the opposite side of the court. It is melancholy that this fine house should have been dismantled, though one is glad to learn that the present owner is taking every care of the remains against further decay or dilapidation. A sheet of measured details is added to the photographic illustrations. The section of the plinth moulding has a curiously fourteenth-century appearance.

Of Rushton Hall, which comes next, Mr. Gotch remarks that "for simplicity of design combined with stateliness of effect" it bears away the palm among buildings of this period. We hardly think "stateliness" is an expression which properly describes Rushton; it is rather a symmetrical picturesqueness, if one may combine the two ideas. The most notable point about it architecturally is the treatment of the front of the quadrangle as a corridor of one story only, the strongly-marked horizontal lines of which contrast admirably with the more vertical character of the main building, while the arrangement is both sanitary (in regard to affording more circulation of air within the quadrangle) and architecturally effective. In fact, it may be doubted whether, on the former ground, the courtyard of a quadrangle-house ought to be closed in any other manner than this.

Part III. includes also Audley End, to which, however, only one plate is devoted, though some details occur, with other similar work, on another plate. We can supplement this with various views of the house published in the present issue (see lithographs). Mr. Gotch gives the original plan from Thorpe. As it now stands the house, as shown in our view of the "west front," is a centre block with two return wings symmetrical in treatment as far as they can be seen together, though the outer façades of the wings are treated differently. For although these wings were originally connected by a return across the front, the outer façade of the left-hand wing is, and apparently always was, the principal or show front of the house. One of the two double-storied porches is shown in one of our illustrations; this, which is the best feature in the exterior of the house, is the subject of the illustration in Mr. Gotch's collection. But Audley End

* Architecture of the Renaissance in England, illustrated by a series of views and details from buildings erected between the years 1560-1630, with historical and critical text. By J. Alfred Gotch, F.S.A., F.R.I.B.A., assisted by W. Talbot Brown, A.R I.B.A. London: B. T. Batsford. 1891-1894.



Ceilings, Audley End.

was originally a much larger and more imposing house than the existing portion gives an idea of. Thorpe's plan, given by Mr. Gotch, shows a great square courtyard surrounded by buildings, in the rear of and somewhat wider than the present house. The buildings were narrower than the remaining front blocks, but according to Thorpe's plan there was an open colonnade or arcade down the two opposite sides. This portion of the building was taken down, either in 1700 or 1749, according to different authorities; probably, we may assume, because the then owners found the house too large for them to keep up. The present house, therefore, represents less than half, though probably the most stately half, of the original building. Mr. Gotch quotes Evelyn's enthusiastic account of the mansion when in its entirety. "It is a mixt fabric 'twixt antiq and modern," he says, "but observable from its being compleatly finish'd, and without comparison is one of the stateliest palaces in the kingdom. It consists of two courts, the first very large, wing'd with cloisters." It should seem from this, that the court which has been destroyed was then regarded as the entrance court of the house, and that what is now the front was then the back, or Evelyn would not have spoken of it as the "first court." He mentions that the balustrade was then composed, like those still existing on some other houses of the period, of "a bordure of capital letters"; this, as will be seen from the illustrations, is now gone, and replaced by a balustrade of the more ordinary kind. Probably the "letters" became weatherworn and damaged, and, the taste for that style of balustrade having gone out, were replaced by the present one.

Stately as Audley End unquestionably is, even in its present aspect, it is somewhat cold and formal externally in comparison with many other mansions of the period. It wants the character derived from the bold and original treatment of the windows which we find in some other examples; they are regularly spaced in a somewhat tame manner and not architecturally grouped, though the effect of the two great projecting bays at the ends of the wings is fine. Internally, however, its decoration is of the best character of the period; rich and sumptuous, yet for the most part refined and graceful. The timber roof of the great hall, shown in one of our illustrations, is somewhat ragged and fussy in outline, but the fireplace represents the best art of the day in this kind of work (see illustration), in spite of the defect of the rather weak and broken-backed scrolls on either side of the over-mantel. Some of the ceiling designs are very fine; two of them are illustrated in the annexed cuts, slightly reduced from a sheet of details of this class in Mr. Gotch's book.

Among the fireplace decorations which form prominent and striking features in these houses, that of the ball-room at Knole House is one of the most effective plates in Mr. Gotch's collection, and we have, by permission of the publisher, reproduced it as a lithograph in the present number. Perhaps the author is not wrong in his remark that the fireplaces at Knole seem less indigenous, and have more the look of having been transported bodily from some other site, than in some other cases in which they are more obviously designed for their place; and Mr. Gotch's criticism is just also in regard to the fact that, in both this and another chimney-piece in the same house of which he gives an illustration, the elaborate decoration of the over-mantel seems to form a frame for nothing, except a marble panel. There may, however, have been an intention of eventually occupying this space with something worthy of the frame, in the shape of a bust or a bas-relief, when it could be procured. We should not see any reason to suppose that this chimney-piece was not English work; indeed there are details in it which are strikingly similar to those of the Paston monument in North Walsham Church, illustrated in our pages under date August 31, 1889; the festooned knots of flowers and ribbons, the coupled Ionic columns with marble shafts, might almost have been from the same hand.

It is disappointing that a plan so remarkably suggestive as that of Westwood House—a central block with four wings projecting from the angles obliquely (the wings are an afterthought, much later than the centre), should not have led to a fine architectural treatment; but Mr. Gotch chronicles and illustrates the porch, a spacious and stately one with a Corinthian order of rather conventional type, as the only portion of it worth attention. There is something to be said as to the possibilities of symmetrical devices of this kind in planning, in the case of mansions of the first order, in which stateliness and strictly-observed symmetry of plan are not out of place. The difficulty, of course, is to combine such generally symmetrical lines of plan with a convenient interior arrangement; but certainly one cannot help thinking that the types of mansion plan are not by any means exhausted. We fully share the author's enthusiasm as to Canons Ashby, the drawing-room of which he gives; the columnar chimney-piece here is one of the most charming examples of its kind to be met with anywhere, although it may be critically objected that the central coupled columns in the over-mantel design seem to sit rather heavily on the light mouldings of the fireplace architrave beneath them, and to require more support, architecturally even; that they have required it structurally is shown by the manner in which the architrave has cracked and dropped in the centre. The rich ceiling with its large panelling has a very fine effect as a whole; the false note lies in the too naturalistic treatment of the large thistle-sprays; an object-lesson on things to avoid in this kind of work.

In Part V. we have in the front of Fountain's Hall one of the most picturesque bits in the book, showing how much effect can be got by the mere disposition of walls and windows. The centre portion of the ground floor is slightly set back from the wings, the upper story set back a good deal further, with a large window on either side and a tall narrow semi-circular bay in the centre, projecting on to the flat left above the ground story. Nothing can be more picturesque than this simple incident of the central half-round window; it is this happy fancy of the architect which gives all the character to the front, all the details of which are as simple as possible. The setting back of the upper story of the centre arises naturally out of the plan, in which, owing to the difference of level in the ground

at front and rear, the hall has to be reached by a staircase parallel with the front wall, after the front door is entered; the piers which separate this staircase from the hall carry the upper external wall. Burton Agnes Hall, Yorkshire, another building of simple detail but of great picturesqueness, looks, as the author observes, like a brick building astray in a stone country. Here the wings project boldly and are finished by semicircular projecting bays with a very picturesque arrangement of windows; while, as a foil to these, the line of the recessed front is broken by two square projections, the entrance being in the side of one of these; and this side is emphasised by the introduction of a small order on each story, a feature which would seem eccentric in its position but for the motive given to it, of marking the point of entrance. The staircase at Burton Agnes, a remarkably rich erection of carved standards and string-boards, is the subject of a separate plate. A very fine illustration of the interior of Middle Temple Hall is another of the treasures of Part V., which includes also five fine plates of different patrons of Hatfield House. Here, in contrast with some of the preceding illustrations, we see what can be accomplished by lavishness of decorative detail, not indeed of a very pure order, but exceedingly effective *en masse*.

Cambridge and Oxford furnish a considerable proportion of the illustrations in the sixth and concluding part of the work, with some miscellaneons buildings of minor interest, and the whole concludes worthily with two plates of Wollaton Hall, a general view, and a portion of the north front given on such a scale as allows the character of the detail to be studied. This detail is not all in the best taste; there is too square and hard a character about it, and the projecting quoins which form bands round the middle of the pilasters are ugly when regarded as detail, though they perhaps help the effect of richness and multiplicity of the whole. It is as a whole, indeed, that Wollaton must be judged; its detail is unsatisfactory, but the total effect is superb, and all the more effective from the remarkable preservation of the stonework. As the author observes, the strict symmetry of the plan has rendered it difficult to secure convenient disposition for the practical interior services of the house.

It would have been convenient if the county or neighbourhood to which each building belongs had been inserted in the title of the plate, as well as in the letterpress, which is necessarily separated from the plates.

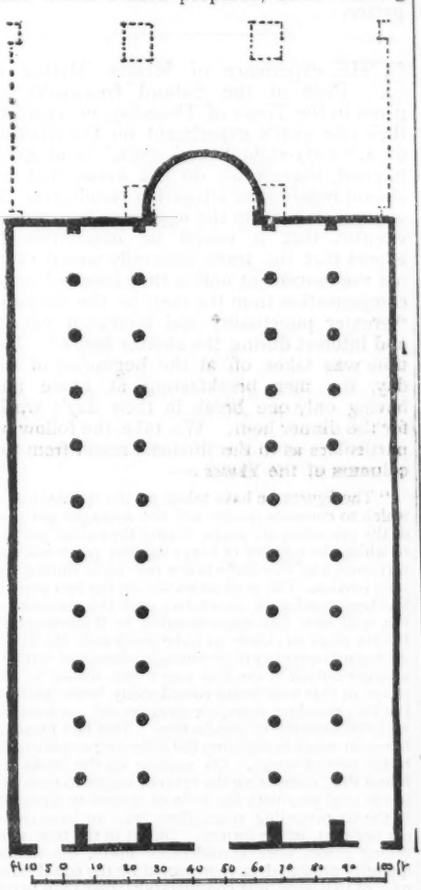
As a whole, this is a collection of illustrations for which we ought to be exceedingly grateful to the author. It is an endless pleasure to turn over these representations of houses of so fine a period of our national architecture; for national it essentially is in its feeling and in many of its details, although derived indirectly from Italian sources. It may furnish many a hint to the modern architect, and its appearance could not have been more appropriate than at a time when the interest in this school of architecture has so remarkably revived. Still, bearing in mind the lesson of Professor Aitchison's recent lectures on the "Advancement of Architecture," we will hope it may be used for study, suggestion, and further development, rather than for mere imitation or reproduction.

THE CHURCH OF ST. JOHN AT DAMASCUS.

By Mr. R. Phené Spiers.

WHEN, at somewhat short notice, I wrote the description to accompany the reproduction of my drawing of the interior of the Great Mosque at Damascus, I was under the impression that the great transept was portion of the original church erected by Arcadius. Subsequently, on trying to work out the plan of the dome (incorrectly shown in published plans), I came to the conclusion that it was a portion of the additions to the church made by the Shereef Walid in 705 A.D.; firstly: because the arch on the left of drawing seemed to be the natural termination of the nave, excepting the apse; secondly: because, as suggested by Mr. Lethaby, in his interesting contribution of March 17, a transept of so great a width, viz., 14 ft. wider than the nave, would be unparalleled,* and, thirdly, because the peculiar and irregular arrangement of the arches of the nave and transepts seemed to have been motived by their addition to a previously existing building.

Mr. Lethaby is of opinion that the transept was the original church, to which, contrary to the almost inevitable rule of all Early Christian churches, he is obliged to give an axis running north and south. From want of further information, which I hope to obtain shortly, I have been unable to complete a general plan I am preparing of the mosque and its surroundings; but Mr. Lethaby's description of the mosque and its court will render clear the further suggestions I have to make. I enclose a plan which I have prepared, since reading



Mr. Lethaby's article, in order to meet some of the arguments which he puts forward in favour of his restoration. For the moment it is immaterial whether the apse shown is at the east or west end of the church. The west was the correct site, and if, as I suppose, the church was built in imitation of Constantine's great basilica in front of the Holy Sepulchre (destroyed by Chosroes in 614 A.D.) that should have been its original position. The whole length of the church from the east or west wall to the back of the apse would have been 212 ft. The probable length of Constantine's basilica at Jerusalem also, to the back of the apse, was about 240 ft. The width of the Damascus church was 118 ft., that of the nave 40 ft., of the Jerusalem church 108 ft., the nave being probably 48 ft. Let us, however, take some other examples. St. Demetrius, Thessalonica was 155 ft. long and 103 ft. wide, with a nave 41 ft. wide (in all cases taken centre to centre of columns). Eski Djouma, also in Thessalonica, 145 ft. long, 95 ft. wide, nave 48 ft. The church at Bethlehem (exclusive of the apse rebuilt by Justinian), 116 ft., width 107 ft., nave 44 ft. Of western churches, St. Apollinare-in-classe, Ravenna, was 180 ft. long, 100 ft. wide, nave 50 ft.; St. Peter's at Rome, 278 ft. long (exclusive of transept and apse) width 204 ft., nave 80 ft; and St. Paolo Fuori-le-Mura, Rome, also exclusive of transept and apse, 280 ft. long, 186 ft. wide, nave 80 ft. There is not, therefore, so great a difference in the dimensions as to make the church I propose (without the transept) unreasonable when the great importance of the city of Damascus is taken into consideration. Of the churches above named, Constantine's basilica (according to Eusebius), the church at Bethlehem, St. Demetrius at Thessalonica, and St. Peter's and St. Paulo fuori-le-Mura, Rome, all had double aisles on each side. In order to meet Mr. Lethaby's objection to "three equal spans in a basilica nave," and also because there would be a fair probability of double aisles having been adopted in Arcadius' church, I have shown another row of columns down each of the aisles. When the Shereef Walid built the transept and doubled the length of the church, I suggest that he unroofed these aisles, took away all the columns, and transplanted them to the eastern (or western) half of the church, whichever it might be. This would account for the singular fact that the columns are all of the same length, and the capitals of the same style on both sides. (3) There are no women's galleries in the church at Bethlehem; perhaps with outer aisles the women were allotted this part of the church. (6) The east and west windows of the dome are not blocked up by the roofs of the east and west wings, as they are at a much lower level than the transept, and the roofs of the north and south transepts have been raised at a later date; the original pediment above the north transept still exists. (7) The fountain in the court is Saracenic; (8) and (10) are in favour of Mr. Lethaby's view, unless the north wall was rebuilt with arches open to the court; as the Mosque of El Aksa at Jerusalem and the other suggestions are answered by the theory I now venture to put forward.

Mr. Lethaby points out that the niche pendentives resemble features in the church in Isauria, where the dome no longer exists; the rectangular space there vaulted, however, was only 22 ft. by 20 ft. The central transept walls of Damascus are 45 ft. square, and I doubt very much whether at this early period the Byzantine builders were capable of erecting so large a dome as this. I see no reason why the actual dome should not have been the original one erected by the Shereef Walid. Pendentives, gallery round, and dome all seem to me to be of the same period. The type of pendentive adopted in the Church at Isauria is to be found in other Greek churches down to the twelfth century, and it formed the favourite feature in the churches of the South of France, at Le Puy—St. Martin d'Ainsa at Lyons, and, in another form, at Riom. It was therefore a well-known expedient for centuries, and some of the 1,200 workmen imported from Constantinople by the Shereef Walid to build his church are likely to have been acquainted with it.

The remains of the south wall of the cella of the ancient Roman temple are shown on Mr. Lethaby's plan, and it is singular that both here and at Palmyra the temple ran north and south, and was not situated in the centre of the great temenos which surrounded it. Neither the foundation-walls of the cella or of the peristyle which probably surrounded it appear to have been utilised in Arcadius's church. On the supposition that Arcadius decided that this church should lie in the axis of the great court (which on the north side is represented by the existing cloister), Mr. Lethaby's theory would account for their not being used, but on the other hand, if the apse of the church I suggest were at the eastern end it would not have

* The transept of St. Paolo Fuori-le-Mura, Rome, is of the same width as the nave thereof, viz., 80 ft.

interfered with the temple, which at that time may still have been in existence. I am afraid that my suggestion as to the transept has misled Mr, Lethaby, but I am not sorry, because it has led to a most ingenious theory on his part, and I know he prefers archæological games to those of chess, backgammon, or even draughts. R. P. S.

NOTES.

LORD ROSEBERY'S speech last week on the occasion of a presentation to him of an address of congratulation by the London County Council, was an interesting and clever piece of work. It was a eulogium of the work of the Council, and the speaker was careful to place work attempted but not yet done on the same footing as if it had been attained. Thus the Council were congratulated on their schemes for Betterment and the taxation of ground values. When good intentions are counted as good deeds there are few corporate bodies and few individuals of whom an accomplished and tactful orator cannot say some very pleasant and apparently truthful things. But what has been done in the way of administration by the Council is not a subject for great praise; it is the first business of such a body to administer the local affairs of the Metropolis in a manner satisfactory to the inhabitants of London. It may be admitted that much of their administrative work has been fairly well performed, but analogous work is equally well done by the corporations of the great provincial towns without any flourish of trumpets. On the other hand, the Council have, unfortunately, over and over again shown in some respects, and chiefly in connexion with questions of principle, a great absence of business instinct and of tact. It is admirable of Lord Rosebery to endeavour to elevate the tone of local patriotism, and to try to instil a broad spirit into the administration of local affairs. But we could have wished that he had been last week more a critic than a eulogist. His position enables him to tell home truths to the Council; instead, he sent them away conscious that they had great duties to perform, and fully satisfied that they were the men to do them, and without any doubt of their own capacity.

THE completion of the decoration of the Conservative Club in St. James's-street has lately been taken in hand. The building was erected in 1842 by Messrs. Smirke & Bassevi, and contains some fine and well-proportioned rooms. A feature of them is the central hall, square on plan, running through two stories, and lit by a circular lantern, communication on the first floor being obtained by means of a circular projecting landing, balustraded. The original scheme of decoration was commenced in 1845 by Mr. Frederic Sang, when the upper part of the central hall, described above, along with the coved ceiling, was decorated in a style which was called "Raffaelesque," but which will be better understood by our readers as "Modern Italian." The committee being desirous of re-decorating the lower portion on the ground floor, this was effected a short time since by casing the walls with white marble, some coloured marbles being introduced in the balusters and panels of the grand staircase which leads to it. This was executed by Italians, under the direction of a London firm of upholsterers, and seems to have caused some dissatisfaction to the members on account of its faulty execution. The general body of members, however, objected most strongly to the cold appearance of the white marble facing in the hall, and so they again employed the original artist, who has prepared and (assisted by his son) carried out a scheme in which the marble work has been "roughed up" (so that colour will adhere to it) and painted over in the same style as the upper portion! In other words, the marble has been made to look like plaster, portions of the marble architrave being gilded. The decorations are carried out by artists from Munich, and will be understood when we say that greens, blues, reds, and yellows of a muddy hue, in which combinations of female figures in frames, portraits (supposed) of poets and painters, dolphins, birds, fishes, and snakes are woven together by means of the orthodox modern whirligig scrolls, form a whole which is as common and tawdry as it is meaningless and absurd. It would have been better if the committee (which includes the names of some well-known architects) before embarking on a scheme of such considerable magnitude and importance to the interior of such a fine club-house, had consulted someone who would have been content to have designed something more in harmony with a building which has so many good points, and not have spoilt the work of two architects, since deceased, with decoration which, although executed with a technique which is certainly not bad, has by the general vulgarity and coarseness of its effect taken away from the dignity of one of the grandest staircases in London. It reminds one of a Genoese palace.

THE experience of Messrs. Mather & Platt at the Salford Ironworks, as given in the *Times* of Thursday, in regard to their one year's experiment on the working of a "forty-eight hours' week," is of great interest, though we do not know that we should regard it as altogether conclusive. It was pointed out to the workmen, in a special circular, that it would be impossible to expect that the trade generally would carry out the movement unless they received some compensation from the men in the shape of "greater punctuality and increased energy and interest during the shorter hours." The time was taken off at the beginning of the day, the men breakfasting at home and having only one break in their day's work, for the dinner hour. We take the following particulars as to the financial result from the columns of the *Times*:—

"The figures we have taken as the standard with which to compare results are the averages per year of the preceding six years, during the earlier portion of which the number of hours worked per week was fifty-four, and fifty-three hours per week during the later portion. The production during the two periods has been similar in character, and the turnover in the trial year has approximated to the average of the six years so closely as to be practically the same. As regards quantity of production, there was actually a larger output in the trial year; but, owing to the prices in that year being considerably lower than in the six preceding years, the turnover did not increase with the amount of production. This fact must be borne in mind in studying the following statement as to the cost of wages. On making up the books we found that, comparing the ratio of wages to turnover in the trial year with the ratio of wages to turnover in the six preceding years, there was an increase of 0·4 per cent. in the former. But as in the trial year selling prices were considerably lower, the actual quantity produced, as represented by the equal turnover of that year, was considerably larger than in the six preceding years, therefore the ratio of the cost of wages to the turnover in that year must have been proportionately less. Had prices ruled the same, the turnover in the trial year would have been greater, and the wages cost, instead of showing an increase of 0·4 per cent., would have shown a decided decrease. We have given no credit for this fact to the side of the trial year, but show the actual result as given on the comparison we have instituted—viz., an increase of 0·4 per cent in the ratio of the wages cost to the turnover. This, however, does not exhaust the changes made by the reduction of the hours. We have had to discover what other advantages and disadvantages have arisen from it. The question of saving in consumables on the one hand, and the greater load of fixed charges on the other, have been the subject of close investigation. We have found a marked economy in gas and electric lighting, wear and tear of machinery, engines, gearing, &c., fuel and lubricants, and miscellaneous stores. On the other hand, we have examined the increased fixed charges due to interest of plant and machinery, rent and taxes, permanent staff on fixed salaries, being employed five hours less per week. The balance of debtor and creditor account on these expenses is unmistakably in favour of the trial year. The credit from these items to be carried to the trial year is an amount equal to 0·4 per cent. on the net amount of the year's turnover. Thus, by a remarkable coincidence. a saving of 0·4 per cent. is secured as a direct consequence of the shorter hours, which counterbalances the debit of 0·4 per cent. in the increased wages cost."

As might naturally be expected, the improvement in regard to "lost time" was very decisive. Messrs. Mather & Platt think that there has been no undue pressure of working conditions, and observe that a year is rather a long period to carry on a "spurt." That is quite true, and there is something very attractive in the spectacle of combined energy of masters and men to show what can be done by making the most of shorter hours of time. We cannot help thinking, however, that this expenditure of increased energy in a shorter time must in the end mean shorter average of life or of working capability among the workers. Work under pressure of time is the most wearing thing that there is, and it by no means follows that a pressure which can be kept up without sensible inconvenience for a year will not make its effects felt at the end of five or ten years. Of course it may be regarded as an open question whether it is best to work strenuously over a shorter life or to take work more easily over a longer one; but we imagine the sense of mankind, even of those who do not shirk hard work, is on the side of the latter alternative. We frequently read lamentations over the comparatively early death of very hard-working men, who have overtaxed their endurance before the average time; and that is what we think it must come to. It may be added that Messrs. Mather & Platt by no means desire the imposition of shorter hours by legislation; they speak decidedly on that point. They want to see it as an arrangement between employers and employed for the good of both. Whether it is so it will take more time to show.

A LONG report by Dr. R. Bruce Low to the Local Government Board deals with the circumstances of the river Trent in Lincolnshire and part of Nottinghamshire, with special reference to the water supplies of populations resident on or near the banks of the river, and to the occurrence amongst those populations of enteric fever. The Trent for a distance of about thirty miles from its mouth is a tidal river, swept at spring tides by a bore, locally known as "the Eygre;" the inflowing water rising to a considerable height and scouring up the mud in the channel and on the banks, increasing in this way the usual turbidity of the water. This, in itself, is not very promising for a river largely used for drinking-water supply, but we further learn that almost from its source the Trent becomes polluted with sewage. The river and several of its tributaries constitute the natural drainage of nearly the whole of Staffordshire. In its passage through the densely-populated Pottery district the Trent is admittedly polluted, and lower down the crude sewage of many places, as well as the effluents from sewage farms, mingle with the waters of the Trent and its tributaries. The sewage of Nottingham is disposed of upon land adjoining the Trent at Burton Joyce, about five miles from the town and about eighteen miles above Newark. The effluent, owing to the care which has been, and is being, taken with the preparation of the land used as a sewage farm, is, under ordinary circumstances, clear and free from objectionable smell. But in times of heavy rainfall it is found necessary to turn the contents of the flooded sewers of Nottingham direct into the Trent. In this and other ways much untreated sewage at times reaches the river. Still lower down the crude sewage of Newark passes directly into the Trent, and farther down still the town of Gainsborough discharges its sewage into the river, In addition to the towns last mentioned, the whole of the intervening places on the river drain into the Trent without any attempt at purification of their sewage. An instance is mentioned where an enthu-

siastic admirer of Trent water, in a riverside village, was led to abate his enthusiasm after drawing a pailful of water from the river to fill his teakettle; on this occasion he found solid fæces in the pail, and he has since discontinued the use of river water in his household. After this it is not surprising to read that "the River Trent cannot be regarded as a safe source of water-supply to any individual, or community, located on its banks. As showing how far this opinion has been locally recognised, it is only necessary to state that the towns of Newark and Gainsborough, which formerly drew their supply in the one case in part, and in the other wholly, from the Trent, have abandoned this source. Both towns have sunk bore wells in the new red sandstone to provide supplies for their inhabitants. And it is evident that if the Trent is recognised to be unfit for supplying wholesome water as high up as Newark and Gainsborough; it must be much less fit to supply the villages now using it below Gainsborough, after it has been further polluted by the sewage of these two towns and in other ways."

ON Wednesday evening, the 21st inst., Professor Silvanus Thompson delivered a lecture on "The Production of Electric Motive Power," at the Carpenters' Hall. He began by stating that it was important to notice that electricity was not a motive power; it was merely an agent by means of which we transmit power, just as a rope or belt going round two pulleys transmits power from the one to the other; but the rope or the belt is not a source of power. Coming to the relative cost of producing electric currents by batteries and dynamos, he stated that since zinc costs, roughly, twenty-five times as much as coal, and since we get from the combustion of 1 lb. of zinc only one-sixth of the energy we get from the combustion of 1 lb. of coal, the former method is the more costly. In electric light stations it was found that for every one Board of Trade unit we put into our mains, and for which we are not allowed to charge more than 8d., we have to burn 8 lb. of coal. A dynamo might be described as a kind of pump for keeping up a circulation of electricity with great pressure. The applications of electricity for transmitting motive power were practically endless. In Boston there were 400 miles of electric tram-rails, and there was more electricity going out of the central station for these trams all day than out of the largest London station with its heaviest load on. He ventured to predict that in a few years we should use more electricity for motive power than for lighting power. One thing we had in this country which they have not in America, and that was electric railways for heavy rolling stock. Some interesting statistics were given of the transmission of a hundred horse power from Lauffen to Frankfort, a distance of more than a hundred miles, by means of three copper wires each of only one-sixth of an inch in diameter. An illustration was shown of a motor of three-thousand horse power made by Siemens and Halske. Two motors of about half-a-horse power each were also shown running with the alternating current supplied by the City Company. In America he was much struck by the Co-operative Factory System. Large steam-engines and powerful electric machinery supplied currents to suites of rooms in a large building. Anyone could hire a room or set of rooms in the building and pay for the current he used by meter. He could also hire a motor, anything from a two-boy power upwards. There was no doubt that there was a demand for this kind of power in a place like Clerkenwell, for example, where there were plenty of workmen who could not afford a steam-engine or a gas-engine, or perhaps lived in an attic where it would be impossible to have an engine, and who would willingly pay five shillings a week for the rent of a motor and twopence per horse power per hour. Electric power was especially the power for the poor man. The use of electricity for motive purposes would have considerable effect on certain industries, as for example, metal working and wood turning. We might hope that in the future, there would not be so much herding of men in large factories. Each man would be his own master, since motive power could be had economically without the necessity of a large capital outlay; so that we were justified in expecting that motive power being distributed so readily, so easily, and so cheaply would have no inconsiderable social influence on the future of certain industries. The lecture, which was illustrated by many striking experiments, was listened to intently by a large and enthusiastic audience.

IN the twelfth Annual Report of the Bradford Sanitary Association we have some interesting information given by Mr. Paterson, the engineer to the Association, as to some of the sanitary defects found by the officers of the association in the course of inspection in their district. One of the most curious of these consists in the frequent introduction, especially at Ilkley, of subsoil drains laid alongside and actually touching the walls of good houses at the footing level, and discharging directly into the foul drains: thus providing for the introduction of sewer air into the walls and cellars of houses all round. Another curious eccentricity of plumber's zeal in the cause of sanitation consisted in his having disconnected a sink waste from a soil-pipe and connected it with a rain-pipe which led into a storage tank of rain water. An instance of the revelations which may be afforded by the smoke test is mentioned in a case where smoke inserted in a lamp-hole in a shrubbery issued strongly in two closets, the scullery, coal-cellar, and the servants' attic. "The occupier was not aware of anything wrong with his drains." The report closes with a notice of the recent experiments of the Sanitary Institute on the flushing of water-closets, which the Bradford engineer rightly says "should be known and discussed as widely as possible;" and after treating with deserved ridicule Sir F. Bramwell's recent letter in the *Times* on the subject, and his "piston of water," Mr. Paterson puts the pointed question, "Are the drains to be stopped and the production of sewer-gas to be indefinitely increased within the breathing space of all large cities for the sake of economy of water?" Even the recommendation of the Sanitary Institute Committee Mr. Paterson considers to be short of the mark, and he observes that there is no reason to doubt the wisdom of the former policy of their own borough in permitting a maximum of at least five gallons.

IN the annual report by the Medical Officer of Health for the Whitechapel district on the sanitary condition of that district, we notice a very undesirable state of things alluded to in regard to water supply to some of the modern high buildings erected for what are called "model dwellings." It appears that during the prolonged drought of last year inconvenience was frequently caused through the absence or scarcity of water throughout that part of the district, which was supplied by one of the water companies, and that the difficulty was enhanced by the fact that whereas all other Metropolitan Water Companies are compelled to send water up to a height of 60 ft. above the pavement level, the Company referred to are only bound to afford a supply up to 40 ft. The effect of this arrangement has been to limit the water supply to many tenants residing in the upper flats of model dwellings. The medical officer was compelled, in one instance, to exert some pressure upon the owners of a block of buildings, where the tenants had suffered from the short supply of water: the owners issued a summons against the company, and in the result, the summons was dismissed. Subsequently, a meeting was convened at which all the owners of model dwellings which were supplied by the company were represented. As the outcome of that meeting, memorials were forwarded to the London County Council by the owners of the model dwellings, as well as by some of the vestries and boards interested in the matter. The question, as the medical officer observes, is of vital importance to the health of the inhabitants, and the circumstance affords another example of the manner in which the health of London is at the mercy of the powers enjoyed by water companies to arrange matters for their own advantage rather than for the good of the public.

AN "Arts and Crafts Guild" has been formed at Sheffield with the object of improving the handicraft art of the city, the holding of exhibitions, and to bring the work of the members more prominently before the public. The scheme was formulated at a meeting held on the 22nd inst., at which various crafts were represented. No doubt this excellent movement will be followed in most of our large towns before long. Mr. Charles Green is the President of the Sheffield Society, and Mr. C. W. Crowder the secretary.

ARRANGED round the walls of the great hall of the Town Hall at Fulham (Walham Green) are fifteen sets of drawings sent in in competition for the proposed decoration of the large hall, small hall, and staircase and vestibule. Owing somewhat no doubt to the awkward proportion of many of the panels in the great hall, many of the competitors have subdivided these features, and in some cases so altering them in form as to change the design completely. As schemes of colour the exhibition is not happy, the majority of the designs being altogether too strong in colour. Four sets, however, are of far greater excellence than the others. "Spes," in a treatment which he names "Raphaelesque." shows a very complete set of drawings, refined in detail and delicate in colour. In the great hall panels are arranged on either side of the large windows with figure subjects in red on an ochre ground. The ornament of the domes has been treated in blue on a delicate ground of flesh colour. The dado of the hall is shown in brown, but whether proposed to be carried out in wood is unexplained on the drawings. The vestibule has panelling introduced between the pilasters, with circular panels above containing figure subjects on a red ground. The small hall has likewise panels introduced with a row of small figures, in ochre, over it. The ceiling has fine Renaissance ornament in yellow and gold. "Seek and Deserve Success" shows the small hall in Pompeian red and white, with emblematic figures introduced in the panels. An interior perspective of the great hall shows "Muses presiding over Poetry, &c., in blue garments against gold backgrounds. The lower panels of the great hall are intended to have "medallion portraits of Historic Worthies of Fulham." Two other sets of designs which seem to us above the others in merit are by "Kudos" and "Delamere." We understand that the decision will be made in a few days.

WE notice that the senate of the Liverpool University are encouraging architectural design by the offer of prizes for the best designs made in competition by students of the Liverpool Architectural Society. The subject for the prize now to be given is "a Lake Boat House." The students' drawings are to be exhibited at an exhibition to be held by the Liverpool University in the course of next month. A committee of the Liverpool Architectural Society will adjudicate the prizes. The same committee

intends to promote during the summer a competition for the best set of measured drawings of some existing building.

WE hear that a subscription-list is opened for collecting 500*l.*, the estimated cost of restoring the Curfew Tower, Barking. It has been generally known as the Fire-bell Gate, and stands as an entrance into St. Margaret's church-yard (a similar tower was demolished thirteen years ago), and the room over its archway was known as the chapel of the Holy Rood, containing a relief of the Crucifixion. The two towers, perhaps, belong to the opulent Benedictine nunnery of St. Mary, of which part of the Abbey Church stood just within the north wall of the present grave-yard. The convent, reputedly the first established in England for nuns, was founded by Erkenwald, Bishop of London, a son of Anna, King of East Anglia (635-54), at the instance of Ethelburga, the bishop's sister, its first abbess. Her successors, with the superiors of Shaftesbury, Wilton, and St. Mary, Winchester, were baronesses *sui juris*, as owners of thirteen and a-half knight's fees, ladies of Becontree and Barnstaple hundreds, and patrons of fifteen livings, comprising those of All Hallows by the Tower, and St Margaret, Lothbury, in London. Most of them were of noble or Royal birth, enjoying precedence over all of their station, and living in a great state, whereof records exist. King Edgar rebuilt and re-endowed St. Mary's, after its pillage by the Danes in 870, as atonement for violence he had offered to Wulfhilda, a nun of Wilton, whom he made abbess. The Abbey Church was again rebuilt *temp.* Mabelia de Boseham, abbess 1215-47, but after Dorothy Barley's surrender in 1539, when the revenue was assessed at 1,084*l.* per annum, the fabric fell into decay. In 1723-4 the ruins were explored. A plan in Daniel Lyson's "Environs," vol. iv., shows a regularly-built cruciform church with squared Lady Chapel, 170 ft. by 44 ft., having two transepts, 150 ft. by 28 ft., a nave of four bays, and choir of two bays; the nave and choir being 22 ft. wide, and the aisles 11 ft., and the arcade piers 8 ft. 6 in. in diameter at base. The precincts suffered considerably at the end of the fourteenth century by an inundation from the Thames, when the nuns expended 2,000*l.* in repairing the bank by Barking Level. A large amount of information about St. Mary's was collected by a Mr. Lethieullier, to whose family the property had passed by purchase in 1754. In 1876, says Mr. Walford in his "Greater London," were dug up in some ground belonging to the national schools, the foundations of the Lady Chapel, and the skeletons of two abbesses buried before the high altar. Lysons gives a drawing of the Fire-bell Gate, and a fac-simile of a charter (Cott. MSS.) granting lands to the convent, by Hodelred, father of Sebba, who, jointly with Sigeric, ruled over the East Saxon kingdom, 663-93. The original parish, since sub-divided, was thirty miles in circumference; it included 1,500 acres of Hainault Forest, one of its trees being the Fairlop Oak, blown down in 1820, and, by Uphall, an ancient entrenchment, oblong in shape, and enclosing forty-nine acres, supposed to be the site of a Roman town.

THE sale by auction of the second portion (800 acres) of the Littleton Estate is to take place in May. The property lies in Littleton, Laleham, and Shepperton parishes, between Ashford and Chertsey, and has been owned by the Wood family for many generations. The house is said to have been built by the same workmen who built William III.'s part of Hampton Court. All of it, except one wing, was burnt some years ago, and, we believe, the flames consumed Hogarth's painting of "Strolling Players in a Barn," of which J. Nichols says, in his "Biographical Anecdotes of William Hogarth," "Mr. Wood, of Littleton, has the original, for which he paid only twenty-six guineas." Sir Guy de Bryen, King Edward III.'s standard-bearer, held the manor, with free-warren, in 1350. The Middlesex side of Chertsey Bridge across the Thames is in Littleton parish. The bridge, designed by James Payne, was built in 1783-5, of Purbeck stone; it has seven segmental arches, and replaces the wooden one mentioned by Leland. The present bridge is a very picturesque structure, but the arches are so inconveniently narrow for the river traffic that it is not unlikely that it will be removed and rebuilt before long on this account.

WE have received a circular in regard to the proposed formation of a "Watch Committee" to look after ancient buildings in London, with a view to preventing as far as possible their unnecessary destruction. The circular, which is signed by Mr. C. R. Ashbee, states the main objects of the committee as follows:—

"1. To undertake the work experimentally for one year; to systematically visit the old buildings of greater London; to catalogue them in the register and on the map; to find out, if possible, who are their ground landlords and their leaseholders, and ascertain the length of the leases; and to discover whether the local public bodies in whose province they lie, could be brought to preserve or utilise them for municipal purposes. 2. To confine the sphere of influence of the Watch to a radius of twenty miles, east and north of Aldgate, and bounded on the south by the Thames, this being the area into which greater London has been, and is rapidly extending, and comprising a great portion of Essex, one of the richest of English counties for old monuments. 3. To form, if possible, during the preliminary year, a watch committee, preferably of residents in the area suggested, who would undertake voluntary work in visiting and correspondence, and later, possibly, any financial liabilities in the continuing of the work. 4. To place the results of the year's work at the disposal of the S.P.A.B.

The mystic initials are those of the "Society for the Protection of Ancient Buildings." The work proposed by Mr. Ashbee may be a very good and useful one, if only it is carried out with tact, with the recollection that the present has its rights as well as the past, and without that "priggish" assumption of superiority which has done so much to exasperate people against the S.P.A.B., and to impair the possible usefulness of its work.

FURTHER NOTES AT THE BUILDING EXHIBITION.

THE official catalogue, out a week after its time, is not very well arranged when it has come out. There has been a praiseworthy attempt at a system of arrangement in placing and in cataloguing the exhibits, by arranging the latter in rows, each marked with a letter of the alphabet, and placing the same letter at the head of the catalogue page; but the numbering is not consecutive, and except for the alphabetical list of exhibitors at the end, with a reference to the page in the catalogue on which their list is to be found, it would still have been difficult to discover the description of a good many of the exhibits. The blank column on each page for visitors' notes is a good feature. On the other hand sufficient care does not seem to have been taken that the description in the catalogue should represent in all cases the things actually exhibited. For instance, we find on page 10 a whole column taken up with a description of the advantages of a certain bath by Messrs. McDowall, Steven, & Co., but on inquiring for it the exhibitor's agent admitted that it was not there. This no doubt is a kind of thing which is the fault of exhibitors, who will seize such an opportunity to advertise wares which they are not at the trouble to send for exhibition. It only shows that exhibitors in these cases require a tight rein, and it should be made clear to them in any future case that they are forbidden to send in for the catalogue descriptions of anything which they do not intend to exhibit, as this is only bewildering and disappointing to the visitor.

The firm just referred to have a good exhibit of grates and kitcheners, among the special features of which are the lifting-fire arrangement, the cone ventilator for carrying off fumes into the chimney (which cannot be interfered with by the cook or attendants), and the hot plates made in a number of parts to allow for expansion and contraction without cracking, and also for enabling the back boiler to be got at for cleaning without pulling the range to pieces. In the same class of work the Eagle Range and Foundry Company have a large exhibit, showing their range with adjustable fire-box; their excellent domestic grate, with regulating doors at top and bottom to increase and diminish the draft, and their chimney top for preventing down-draught, which we described and gave a section of a short time since. The largest grate exhibit, however, is that of Messrs. Yates, Heywood, & Co., who exhibit a great variety of sitting-room grates and chimney-pieces, the latter very well finished and in most cases of fairly good design; as usual in such cases, the least costly and pretentious designs are the best. The "Pinkerton" grate, a circle on plan, with a semicircular back of glazed brick, has no special practical advantage, but has a very pleasing appearance. Among the more practical portion of their exhibits is the range with "quadrant" fire-lift, which it is claimed is specially convenient in working, as there is no rack or catch, and the lifter remains automatically at whatever elevation it is placed. The "Guinness" draw-out oven is a useful one for small tenement houses, where the cleaning of the flues (often neglected) is rendered easy and inexpensive by the lifting out of the oven bodily. The same firm also exhibit specimens of their stable fittings.

Among window exhibits which we did not notice before is Mr. Robert Adams's Climax reversible sash window, the special feature of which is that the cords are attached to sliding pieces to which the actual sash is screwed by removable screws with large milled heads; this gets over a frequent difficulty in regard to reversible windows in which ordinary cords and weights are used, what to do with the cords when the sash is taken out. It has the objection that screws are liable to get lost or forgotten when the sash is taken out, but has merits nevertheless. His "impervious" metal casement has four contact surfaces, and seems impervious; the bolt is not a very firm one, at least in the example shown. Messrs. Mainzer & Farrar's steel casements, if they do not seem quite so satisfactory in regard to probable weather-tight quality, show admirable solid work in the fittings, which entirely get rid of the rather shaky and rattling character too often associated with metal frames and their fastenings.

The Incandescent Gas Light Co. exhibit their lights in action. The light is an excellent one in relation to the amount of gas consumed, and the readiness with which it can be attached to existing burners; the only objection which may be made to it is that the burner has rather a heavy and clumsy appearance; but in situations where this is not of consequence the gain to the consumer in light is no doubt very great.

Those who visit the exhibition with the idea of seeing how the electric light should be installed in a building already constructed, or how provisions may be made in a building about to be erected, for its subsequent installation, will be disappointed. Not only are there no illustrations of the various methods of running the wires, but there are not even examples of such all-important appliances as distributing-boards, switches, and fuses. There is, indeed, but little to notice beyond the ordinary lamp-brackets and fittings. The extensive exhibit of the Coalbrookdale Company, already mentioned, gives Mr. Harry South an opportunity of showing examples of his artistic metal work as applied to electric light fittings. Some of these fittings are of very elegant design, especially adapted for drawing-room lighting, a soft and pleasing effect being produced by the introduction of silk shades enclosing the lamps. He also exhibits other more massive fittings suitable for theatre lighting, of which he makes a speciality. Current is supplied by a Crompton Dynamo driven by a Tangye's Gas Engine.

Messrs. Roger Dawson exhibit some electric light fittings of black iron work at the stand of Messrs. H. & A. Hooydonk, and at the stand of Messrs. Potter & Sons are a few highly finished pendants and brackets of black iron. Messrs. Edmundsons, of Great George-street, Westminster, exhibit electric light fittings, also a motor driving a fan at the stand of Messrs. Ashwell & Nesbit; and Messrs. Pickup & Co., of Bury, Lancashire, show an electrically driven fan in which the frame is wound with four coils to form the field magnets, and a ring attached to the outer ends of the blades is wound to form the armature, a commutator of usual construction being fitted to the fan spindle. The object of this arrangement is to induce immediate starting of the fan at whatever point it may have last stopped, an object which is certainly attained, as

the start on turning on the current is instantaneous. It is, however, difficult to discover any novelties of an electrical nature throughout the exhibition.

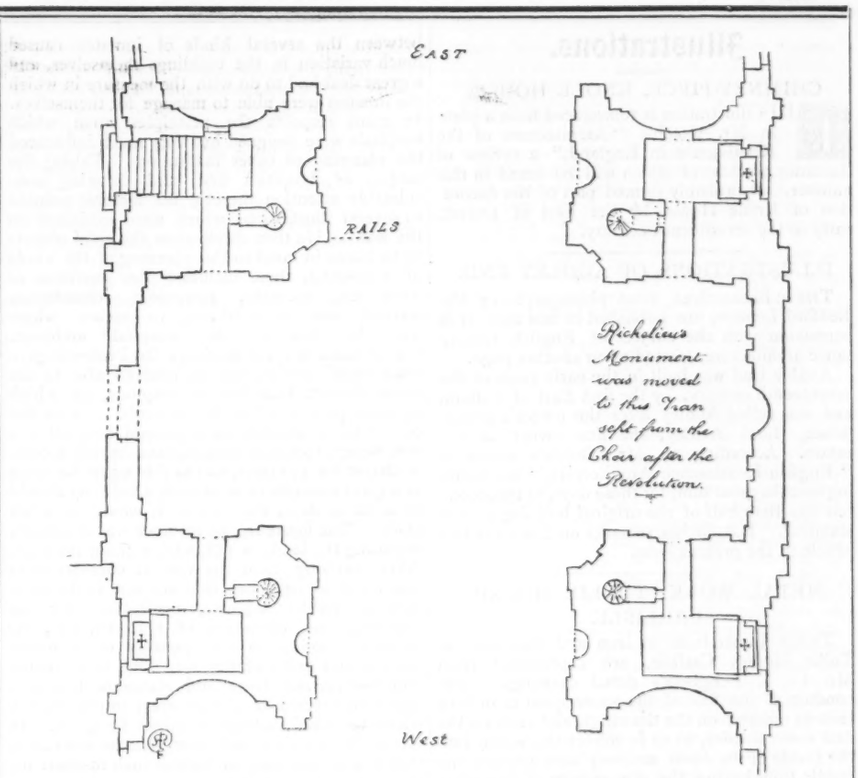
Mr. John Sutton exhibits a patent chimney cowl (metal) for preventing down-draught, which seems as if it really must be thoroughly efficient, in contradistinction to some much-advertised remedies. The chimney is fitted internally with a system of oblique baffle plates, so placed that any down-draught striking on them is diverted to a slit in the side which carries it away, while any wind coming in through the slit creates an induced current. We will give next week a section of the cowl, which differs in construction from any other that we have seen, and is not easily understood by description. The baffle flaps, which may be from one to four in number, are connected by wires when there is more than one, and hung with a certain amount of play so that they can be shaken from below with a cleaning rod in order to shake deposit off them. Whether this would prove a really effectual method of cleaning may perhaps be doubted. The cowls are made in galvanised iron or zinc.

Messrs. Humpherson & Co., sanitary engineers, have a good exhibition of appliances, including what they call the "Perfect" valve closet with an improved overflow arrangement, which has the merit of appearing to work efficiently with a small supply of water. Their "Triune" closet is so-called from being made in three parts, the earthenware basin in a metal stand, and the lead trap-bend below, which can be attached to the basin at any angle according to its situation. The idea that lead bends are superior to the earthenware bend, on account of making a better junction with the soil pipe, has something to recommend it, but we doubt if they can ever be as clean as a glazed earthenware bend. Among other closets exhibited (they are not very numerous) is Kingston's "Silent" Flush Tank, in which the water is introduced at the bottom instead of at the top of the tank through a metal valve which closes automatically when the tank is full. The valve is fitted with a screw propeller, which the rush of water causes to rotate, so as to keep the metal seating contacts closely fitting (on the same principle as Lord Kelvin's tap). The tank is air-tight, and the flushing power is gained by the compression of the air when the tank is filled. One advantage claimed for this is that it requires no fall and can be placed out of sight under the closet-seat when there is a cased seat; but as we disapprove of cased seats altogether, there is no real advantage in having the tank on the floor, where it is more in the way than on bearers on the wall. Still it is a clever and workmanlike piece of mechanism. We may also mention the exhibition by Messrs. Shanks & Co. of their baths and lavatories, which are of excellent quality, but present nothing for special comment.

Among fireproof floors a good one is exhibited by Messrs. Ferguson & Sons, of Carlisle, composed of steel or iron joists and a continuation of fireclay tubes and concrete. The tubes are 12, 13, 14, 15, and 18 in. wide, two being put together to bridge over the space between the joists. Concrete is filled over these pairs of tubes and between them. The concrete between the tubes forms a key to bind the tubes together, that over the tubes forms the level floor. The peculiarity of this floor, as will be seen, lies in the fact that the terra-cotta tubes are placed parallel with the iron joists instead of at right angles to them. It makes a solid but rather heavy floor, most suited for situations where weight-bearing capacity is of importance. Messrs. Willis & Astley's "Fireproof and Ventilating Floor" forms what is called (not quite accurately) a "concrete arch" on corrugated iron centering between the iron joists; terra-cotta "lintels" are placed across, partially imbedded in and partially below the concrete, with wide soffit flanges to form a ceiling; these flanges pass below the iron joists so as to encase them. The webs of the terra-cotta lintels are pierced to allow an uninterrupted circulation of air between the terra-cotta ceiling and the concrete arch, and the patentees state that it is specially on account of this large air-space that they claim fireproof quality for the floor, as the joists and concrete of a floor above the fire are insulated from the heated ceiling below, which is no part of the bearing construction. This would perhaps, delay the break up of the concrete and iron for an appreciable time.

Among objects of which we made a note we may mention Sinclair's comet lamp for contractors, which burns petroleum oil, and by the operation of an air-pump is self-cleansing after use; Mr. C. Rees's metalised wood for decorative purposes, which is a perhaps almost too good imitation of metallic surface; Messrs. Hartley & Sugden's "Chatsworth" boiler, with the flue returned along the top of the boiler; Messrs. Hepton & Sons' corrugated copper cylinder, for securing resistance to pressure at a low cost; Messrs. King & Sons' honeycomb terra-cotta wine-bins, which are more lasting and perhaps in other ways better than metal bins, but take up rather more space for the same number of bottles; Mr. A. G. Bell's fire-resisting doors made of wood, with an interior lining of asbestos, which have stood some severe tests and combine lightness and economy with efficiency; Mr. Swift's dovetailed back for securing tiles on walls, before noticed in our columns; Messrs. Messer and Trollope's bucket fire extinguisher, in which buckets are placed in a water tank telescoped together, each coming out full in its turn, an exceedingly compact way of arranging buckets for this purpose; there is the disadvantage that one can only get hold of one bucket at a time, but two or three of these tanks would include a good deal of bucket-power in a very small space; Messrs. Manning & Andrews' syphonless flushing cistern, which is simply a tumbler bucket arranged to fill itself automatically when empty, and certainly has the advantage of simplicity and nothing to get out of order; and Messrs. Grundys' house-warming apparatus for warming fresh air and furnishing a continual stream of it into a house.

We may have more to say. Machinery exhibits we have purposely omitted for separate treatment.



Plan of Dome-Piers of the Sorbonne Church, showing the Secret Chapels.

"SECRET CHAPELS" AT THE SORBONNE.

THE Sorbonne Church, designed by Le Mercier in 1635, has the first dome ever constructed in Paris, and it is reported that when, one misty morning, the Archbishop of Paris went to Montmartre previous to giving orders to the architect of the Votive Church there as to whether the great church should be capped with a dome or have a tower and spire, he decided on a dome, as it would "stand out" whenever there was a hazy atmosphere, while other forms of steeples, even loftier, would be invisible, and that the first dome he saw that day most clearly from Montmartre was that of the Sorbonne, a fact which caused him to decide in favour of a dome for Montmartre. All descriptions of the Sorbonne Church, from the latter half of the seventeenth century onward, give glowing accounts of this handsome and beautifully-proportioned dome, which rises to the height of 139 ft. from the floor of the church, and is 40 ft. wide at its base. It looks its best from the Boulevard St. Michel, and is far more graceful than that of the Pantheon hard by.

In the seventeenth century the Church of the Sorbonne had no less than nine altars, three of which were strangely hidden away in as many little chapels in the base of the walls supporting the dome, as will be seen by the sketch plan. These unique little sanctuaries were "proprement boisées," says Thierry, writing in 1787; and each contained a picture by a celebrated master. The inner arch on the dotted line in the plan of the North-west Chapel is bricked up now, but the trace of it is there in the shape of a crack in the plaster following the outline of the arch. The rest of the North-west Chapel is now used as a lumber-room. The South-east and South-west Chapels have been blocked up since 1866, when marble slabs, with inscriptions in memory of Richelieu, were put up over the old entrances when the Cardinal's skull was returned to his tomb after having been lost sight of for seventy-three years.

If further corroboration of the existence of the "Secret Chapels" were required, it would be found in Harry Peckham's "A Tour through Holland . . . and to Paris," published in 1788, where he writes as follows:—"In the chapel dedicated to the Virgin" (now the south transept, occupied by Richelieu's monument), "is her statue, in stone, mostly done by Desjardins or Maître de Jardin, who executed the statue of Louis XIV. in the Place des Victories. You will find in a little adjoining chapel a picture of St. Anthony preaching in the Desert. He is seated in an armed chair; not a very common convenience in a desert, nor a very proper attitude for a preacher, but his hair is grey, which is, I suppose, to be an apology for his sitting. Coypel is the master, and the piece does him credit."

Which of the two secret chapels on the south side is referred to, it is impossible to say; but it is to be hoped that, in the approaching restoration of the Sorbonne Church, at least the most accessible of the three little chapels will be opened out—*i.e.*, that on the north side, when possibly a discovery of the pictures may be made, if not of the altar.

JOHN A. RANDOLPH.

CLOCK, HIGH HAM, SOMERSETSHIRE. — The parish church of the village of High Ham has just had a new clock fitted in the tower. The hours are struck upon a large bell. The clock has been made generally to the designs of Lord Grimthorpe by the makers of St. Paul's Cathedral clock, Messrs. John Smith & Sons, Derby.

Illustrations.

CHIMNEY-PIECE, KNOLE HOUSE.

THIS illustration is reproduced from a plate in Mr. Gotch's "Architecture of the Renaissance in England," a review of the latter portions of which will be found in this number. It probably formed part of the decoration of Knole House by the Earl of Dorset, early in the seventeenth century.

ILLUSTRATIONS OF AUDLEY END.

THESE illustrations, from photographs by Mr. Bedford Lemere, are published in this number in connexion with the subject of English Renaissance architecture, treated of on another page.

Audley End was built in the early years of the seventeenth century, by the first Earl of Suffolk, and was called Audley after the owner's grandfather, Lord Audley, the first owner of the estate. According to Mr. Gotch's notice in "English Renaissance Architecture," the building cost the great sum, for those days, of 190,000*l.*; but less than half of the original building is now standing. For further remarks on it see the first article in the present issue.

METAL WORK, TULLIE HOUSE, CARLISLE.

THESE illustrations of iron and lead work at Tullie House, Carlisle, are reproduced from Mr. C. J. Ferguson's detail drawings. The conduit at the foot of the water-spout is of lead (not so marked on the drawing), and rests on the first stone cornice, so as to convey the water into the inside of the open archway and prevent the public from having the opportunity of damaging the lower part of the pipe.

The gateway, of wrought iron, closes the archway referred to; the detail in the head is also given on a larger scale.

MODERN INSTITUTIONS, ASYLUMS, AND HOSPITALS.

UNDER the auspices of the Worshipful Company of Carpenters, a lecture entitled "Modern Institutions, Asylums, and Hospitals," was delivered on Wednesday evening at the Carpenters' Hall, London Wall, by Prof. Roger Smith, F.R.I.B.A. Mr. Warden E. Smith presided.

The lecturer said his subject was furnished by public institutions, of which it might be said that they were modern and of high civilisation. The great institutions which abounded in Great Britain—and, indeed, in Europe—had no counterpart in the history of the remote past, nor even in the customs of the remote present. These institutions included, in one direction, hospitals, asylums, orphanages, schools, sanatoriums, workhouses, infirmaries, and even prisons; in another direction there were board schools, technical institutions, polytechnics, laboratories, and colleges. This was a large subject, so that it would not be possible to say anything about Continental or American methods of dealing with such buildings. There were more ways than one of arranging most of these structures, and, notwithstanding the general diffusion of information and the ease with which it was possible to visit other countries, the Channel and the Atlantic still separated English methods of arranging such buildings from those of France, Germany, and the United States. Some of the earliest traces of big institutions were to be found in India, where Buddhist monasteries were established long before the Christian era, and hospitals were said to have been established to some extent in connexion with them. In Europe the monasteries of the Middle Ages bore a very considerable resemblance to those of the Buddhists, and they were the first public institutions. But the resemblance of all such buildings to modern institutions was very limited. Referring to the first establishment of hospitals for the sick, the lecturer said that St. Bartholomew's dated as far back as the twelfth century, St. Thomas's not being much later, while Guy's was established in 1724. It was stated by Mr. Burdett that there were 8,094 beds in the London hospitals, which accommodated 78,000 sick persons in a year, and that in the asylums for the sick poor of London there was accommodation for 14,000 more. The number of idiots, insane and imbecile, provided for in institutions was equally startling, and the children lodged and fed in orphanages, schools, &c., supported by City companies and public subscriptions, made a further very large army. All these people had to be provided for in suitable ways, and the many differences which existed between the several kinds of inmates caused much variation in the buildings themselves, and a great deal had to do with the measure in which the inmates were able to manage for themselves. In many respects the principles upon which hospitals were designed had very much influenced the planning of other institutions. Taking the subject of hospitals first, and devoting considerable attention thereto, the lecturer pointed to several illustrations which were exhibited on the walls. He then dwelt upon the chief objects to be borne in mind in the planning of the wards of a hospital, these including the provision of fresh air, sunlight, scrupulous cleanliness, warmth and cheerfulness, to secure which was the aim of the hospital architect. Under these several headings the Professor gave some sound advice, and he referred also to the many distinct branches in hospitals, for which separate provision had to be made. As to the cost of these institutions, a general hospital was now being erected at Birmingham, having accommodation for 340 beds, and as this might be taken as a good example of what such a building should be in these days, the cost of it would be a fair guide. The figure in this instance was 206,000*l.*, including the land, or 158,000*l.* without the land. After dwelling upon the various considerations which had to be taken into account in the erection of public asylums, institutions for the boarding and education of children, &c., the lecturer, coming to the question of technical schools and polytechnics, said that in Germany and Switzerland large and elaborate buildings had been erected in almost every important city where technical instruction might be given. In Great Britain they had now become convinced that it was their duty to furnish such institutions, the popular form of which had derived its name, and to some extent its nature, from the Polytechnic in Regent-street. The Carpenters' Company had established one at Stratford, and this was highly spoken of by authorities well competent to judge, including some who had come from India to see it. The People's Palace was the first example of a structure erected for the express purpose of one of these institutions. Alluding to the many requirements of establishments of this nature, the lecturer pointed out distinctive features in such buildings as the Carpenters' Company's new technical schools, King's College, University College, Cowper-street School, the Science Schools at South Kensington, &c. Towards the close of the lecture the lecturer spoke of the debt of gratitude which was due to those who, for the most part voluntarily, gave up their time to the management of these institutions. His lecture, he said, was nothing more than a glimpse at a very wide subject, but perhaps enough had been said to convince those present that the buildings erected for English institutions formed a group of public works very well worthy of study. Their contrivance and design required much patience, care, and forethought, and above all, special and exact knowledge of the requirements; their erection called for the best workmanship and the use of the soundest materials; and their maintenance in a state of perfect efficiency demanded constant vigilance.

ARCHITECTURAL SOCIETIES.

ARCHITECTURAL ASSOCIATION.—DISCUSSION SECTION.—A meeting of the Discussion Section of the Architectural Association was held at 56, Great Marlborough-street, on the 21st inst., when Mr. Charles H. Strange, A.R.I.B.A., read a paper entitled "Hints on the Formation of an Architect's Library." The discussion was opened by Mr. Seaman, and was continued by Messrs. W. H. White, S. B. Beale, H. A. Satchell, E. Greenop, and C. H. Brodie (the Chairman), and was summed up by Mr. Alex. Graham, F.S.A., who attended as Special Visitor.

SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.—A special general meeting of this Society was held at the School of Art on the 20th inst. Mr. E. M. Gibbs presided. A paper was read by Mr. J. Smith on a recently-published book by W. J. Loftie on the works of Inigo Jones and Sir Christopher Wren, or the rise and fall of modern architecture in England. The paper was a review of Mr. Loftie's opinions and statements as to modern English architecture and architects. Mr. Loftie asserted that the shortcomings of modern architects were largely the fault of the public who employed architects rather than of the architects themselves. There was no doubt of the fact that the history of a community was registered in its architectural work. A discussion ensued, and on the motion of Mr. C. Hadfield, supported by Mr. W. C. Fenton, Mr. J. E. Benton, and the President, a vote of thanks was awarded to Mr. Smith for his paper.

EDINBURGH ARCHITECTURAL ASSOCIATION.—The members of this Association visited Sciennes School on the 24th inst. Mr. Wilson, the architect of the school, stated that the class-rooms and lecture-rooms were designed to accommodate 1,686 children, allowing 10 square feet for juveniles, and 8 square feet for infants. If the area of the gymnasium and swimming-bath were added the accommodation would be 1,990. The site extended to 1¼ acre, and had been acquired for 5,676*l.* 18s. 6d., which sum included the expenses of purchase. The total cost of the school, including fittings, offices, playsheds, janitor's house, &c., was 21,874*l.*, or barely 11*l.* per child, basing calculations on the full accommodation of 1,990. After Mr. Wilson had explained from a diagram the arrangements of the school, and had described the system of mechanical ventilation, a tour of inspection was made, and the uses of the various class-rooms pointed out, and the peculiarity of their furniture to suit requirements was noted.

CARLISLE ARCHITECTURAL ENGINEERING AND SURVEYING ASSOCIATION.—At the usual fortnightly meeting of this Association, held on the 21st inst. in the Town Hall, a lecture was given by Mr. J. Hepworth, M.Inst.C.E., on "Our Streets and Roads." He commenced by enlarging upon the excellent Whinstone and granite pavements laid in Carlisle, and pointed out the favourable situation of Carlisle for procuring paving material. After referring to the various classes of paving in general use, the lecturer mentioned the following requirements of a good carriageway pavement: It must be a sanitary pavement, and as noiseless as possible. It must be safe for horses, and afford a sufficient foothold with a minimum of traction. It must be as free from mud and dust as possible. It must be economical, not only as regards first cost, but also with respect to its maintenance and cleansing. It must be durable. It must be easily cleansed and non-absorbent of moisture. It must admit of being readily taken up and quickly relaid for repair at all seasons. He then proceeded to consider the advantages of tar-paving as a class of pavement for which it is claimed that most of the above requirements are met, and at a proportionately small cost, and said, although there is much difference of opinion amongst surveyors about its adoption, the towns of Cheltenham, Shrewsbury, Harrogate, Scarborough, and Nottingham almost exclusively use tar-paving in the principal and residental streets with great success, and at a cost of from a third to a fourth that of granite or Whinstone paving, and stated that on hygienic grounds tar-macadam is undoubtedly to be preferred. The lecturer read several specifications for the mixing and laying of tar-paving, and quoted the opinions of several authorities who, after a proper trial, have reported favourably on its adoption in residental streets and back lanes. The objectionable features of the smooth surface and the black look of the roadway are easily overcome by proper mixing and laying, and the finished coating being made with a light coloured and gritty material. A discussion followed, and a vote of thanks was accorded to Mr. Hepworth for his lecture.

COMPETITIONS.

SCHOOLS, CLENCHWARTON, NORFOLK.—The School Board for the Clenchwarton Parish having advertised for plans to be sent in for new schools and master's house, have received sixty-four sets of designs. The Board have accepted those of Mr. H. Green, of Norwich, while those of Mr. J. H. Gibbons, of Birmingham, were placed second.

HIGHGATE ARCHWAY.—The much-needed improvement in widening Highgate Archway seems to be as far as ever from being carried out. The London and Middlesex County Councils, the Islington Vestry, and the Hornsey Local Board agreed to give 6,500*l.* each to enable the former to rebuild the archway, the London County Council to take all risk, and to promote the Bill in Parliament necessary to carry out the work. The Bill has now been presented, and the expenditure is not limited, but makes each of the bodies named liable for one-fourth of the cost, after giving credit for 1,000*l.* which the Ecclesiastical Commissioners will give towards the work. Under the Bill the London Council would become freeholders in Hornsey, thus getting a footing in the county of Middlesex, which is thought, in view of the "longing eye" London has upon Hornsey, to be very undesirable. Upon these grounds three of the four authorities will oppose the Bill in Parliament.—*Daily Chronicle.*

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—On the 21st inst. a meeting of this Association was held, Mr. Allan Wyon, F.S.A., in the chair. Mr. Sheraton described a curious brass monument, of late date, in Carnarvon Church. Mr. Earle Way exhibited various coins, mostly Roman, recently found in Southwark. Among them was a seventeenth-century token for 2d., issued by a tradesman at Dowgate. Mrs. Collier produced an Elizabethan love-token ring formed of joined hands. An exhaustive paper on "The History of English Parishes" was read by Mr. R. Lloyd. After referring to the growth of Christianity throughout the Roman Empire, he showed its increase under Severus, when Christians were allowed to buy land and to build, and that the effect of the Edict of 303 for the demolition of churches would have affected Britain and Western Europe. He then referred to the few records of Christianity in Roman Britain, the existence of the faith after the arrival of the Saxons by the antagonism of Augustine and his followers, and by that of the See of York to Canterbury. The work of Archbishop Theodore, a Greek, was dwelt upon at length, and it is to him that the division of England into parishes may be assigned. A discussion followed. A second paper was then read, on the discovery of many curious structural features of Saxon and of later times, at Repton Church, by Mr. J. T. Irvine. It was illustrated by plans and drawings.

Books.

Kelly's Directory of the Building Trades. London: Kelly & Co., 182, 183, and 184, High Holborn, W.C.

Kelly's Directory of the Engineers and Iron and Metal Trades and Colliery Proprietors. 1894.

THE seventh editions of these useful works have just been issued, and since they have been published by Messrs. Kelly & Co., we need hardly say that they are well-edited and well-arranged. The Building Trades Directory extends to 2,185 pages, and the Engineers and Iron and Metal Trades Directory approaches nearly 2,000 pages. In the preface to the first work some interesting statistics are given of the number of persons to whom the building trades give employment. In London alone the number is stated to be 120,434, which, compared with the number given in the last census returns, shows a reduction in the aggregate of 5,000, the reduction being extended to nearly every trade. Carpenters and joiners appear to be reduced in numbers 5,811, while painters and glaziers appear to have increased 4,285—results which appear hardly credible, for while the reduction in one trade is capable of explanation, the increase in the other is inexplicable. The number of architects and surveyors practising in London is given in the Directory as 2,024 and 1,271 respectively. Other statistics of an interesting character are given in the preface, reference being made to the severe depression in trade since the last edition of the work was published (1890)—a depression which affected the building trades, but not so severely, however, as some other industries. The Directory includes lists of the Metropolitan Vestries, with their various officers, County and Borough Surveyors, and other official information, though we regret to find that a former suggestion of ours has not been adopted—viz., to incorporate in the work a few pages devoted to lists of the Architectural Societies, the Master Builders' Associations, and the principal trade unions connected with the building trades, with names of the principal officers and statistics of membership. But, as we have before stated, the work is both of an extensive and reliable character. The same remark applies to the Engineers and Iron and Metal Trades Directory, both, so far as arrangement and get-up are concerned, being similar in character, though this work is more freely interspersed with advertisements than the Building Trades Directory. The Directory gives lists of all the various trades connected with metal or having any connexion with or affinity to engineering, and it contains an interesting preface.

NEW DIRECTORIES.

The twelfth edition of "The Railway and Commercial Gazetteer of England, Scotland, and Wales" (London: McCorquodale & Co., Limited; Simpkin, Marshall, Hamilton, Kent & Co., Limited; and W. J. Adams & Co.), has been sent to us, and, like previous issues, it appears to be thoroughly reliable. The railway information, conveyance groups, population from last census (1891), and postal intelligence, have been revised and corrected to present date, and the book purports to contain a complete list, arranged in alphabetical order, of every city, town, village, parish or township, and place in Great Britain—over 40,000—showing the distance from London to each, with through rate routes, also line of railway, locality, population from last census (1891), nearest station, distance from station, post offices, money order offices, and telegraph offices. No pains seem to have been spared to make the work as complete as possible, although one could wish that where there are two or more railways running into a town, some method had been adopted for showing whether they have the same terminus or are situated in different parts of the town. We hope this information will be given in a future edition. The last edition of the work has been in constant use by us, and we have never looked in vain for the information which we have required. It must be an indispensable work in all large offices.—We have received from Mr. Henry Sell, of 167, Fleet-street, a directory of registered telegraphic addresses. Mr. Sell, in the preface to the work, informs his readers that it was in consequence of dissatisfaction felt amougst commercial men at not being able to get any information from the Post Office as to the senders of telegrams when signed by a registered code-word, and also as to what was the code-word of a firm with which they wished to communicate, that he determined to supply what business men required. The first section of the directory gives a list of London and provincial firms arranged in alphabetical order, with the telegraphic addresses opposite, and the second part is devoted to the telegraphic addresses with figures opposite corresponding to the page where the full address may be found. This is a very good arrangement, and the work is likely to be of great service to business people. The compiler suggests that the code-word "Quaintness" should be used to indicate that the preceding name in the message is the registered telegraphic address as printed in this directory.

Correspondence.

To the Editor of THE BUILDER.

WHICH IS THE BEST BRICK?

SIR,—I have been a constant reader of your paper for over twenty years. From it I have obtained much profit and instruction. Will you, therefore, allow me to introduce a question which I think is of great interest and importance to the architects, engineers, builders, and inhabitants of London, and that is—which is the best brick to use in London? By best brick I mean the one that—

a. Can be obtained at a price which will enable it to be used generally.

b. At such price will do the best work.

c. Will stand the greatest pressure.

d. Will withstand the atmospheric conditions peculiar to London.

e. Will absorb the minimum of moisture and so prevent damp.

f. Will be suitable for facing, and what after the experience of the late great fire in St. Mary Axe we know to be of the utmost importance,

g. Will best resist fire.

There is no need to prove the importance of the subject when it is remembered that upwards of 700 millions of ordinary building bricks are used in London every year. It must be evident to every one that it is very desirable that the best bricks only should be used.

Roughly speaking, the bricks used in London may be classified under the following heads, viz.:—

1. The bricks from the alluvial deposits above the chalk, made by hand and burnt in clamps—commonly called stock bricks.

2. The bricks from the gault, made by machinery and burnt in kilns—called gault bricks.

3. The bricks from the Kimmeridge clay, made by machinery and burnt in kilns—called Fletton or Peterborough bricks.

4. The bricks from the Leicestershire coal measures, made by machinery and burnt in kilns—called Leicester bricks.

Up to a few years ago the number one or stock brick was the only brick used in London. Then came in number two, or the gault brick, and in the past few years came numbers three and four.

As far as I know, stock bricks were originally made in Middlesex, near Cowley, whence is derived the name "Cowley Grey;" then they were made in Kent, particularly in the neighbourhood of Sittingbourne; and latterly in Essex.

Gault bricks were originally made in the neighbourhood of Burham and Aylesford in Kent, and afterwards in much larger quantities in the neighbourhood of Arlesey in Bedfordshire.

Fletton bricks have rather a curious history. When there was such a scarcity of bricks—1877-79—works were started at Fletton, near Peterboro. The top or plastic clay only was used, the clay underneath, called "knots," being then considered of no value for brickmaking purposes. Experiments were afterwards tried with the knots, and it was found that with improved machinery semi-dry bricks could be manufactured. Old works have been extended, new works have been started, and now the Fletton bricks are a very important factor in the supply of the London market.

Leicestershire bricks are red in colour, and at present, at any rate, do not come largely into London.

Let us compare the merits of these different bricks.

Stock bricks are under a cloud. A new generation of architects and engineers has arisen, who will not have them, preferring machine-made bricks. Country builders, who during the last few years have done so much work in London, dislike them, and scientific men condemn them. They certainly are brittle, have a bad arris, chip very much, are often irregularly burnt and sorted, and when they arrive on the job do not look in such good condition as a machine-made brick. On the other hand, they do very good work. Let any architect or engineer, enamoured of a machine brick, inspect stock brick work such as he can find, say, in New Broad-street, or in some of the squares near Covent Garden, and he must admit the goodness of the brickwork. They are absolutely impervious to the peculiar atmospheric conditions of London. When pointed and cleaned they are as good as new, and will outlast the sham stone facings of the large buildings in London, all the machine-made bricks, and perhaps even terra-cotta. The stock absorbs very little water. It is a thoroughly plastic brick, and it is an axiom of brickmaking that the nearer the clay approaches a plastic condition when moulded into bricks, the better the brick. The machine-made bricks are not thoroughly plastic; in fact, the Peterboro' bricks are not plastic at all. A stock brick is thoroughly vitrified, containing its own firing, and a large percentage of chalk, which acts as a flux in the same way that limestone does in blast-furnaces, so that every element is fused into one entire whole.

The machine brick is simply baked. The importance of this point is immense.

The stock brick is practically a fire brick. It contains a very large percentage of silica, much greater than either the Peterboro' gault or Leicester brick. Having been thoroughly vitrified it will stand the heat of any ordinary fire. Machine bricks, particularly the gault and Peterboro', will not; they burst and fall to pieces.

When laid, the stock makes a homogeneous whole. Stock brick work laid with cement cannot be taken down, it must be blown down. Machine-made bricks can be taken down as they were laid.

Machine-made Bricks.—Of these the most important are the Peterboro' or Fletton bricks. They are now the rage. The engineers of the large railway extensions on the Great Northern and South-Eastern Railways will have nothing else. They have been specified for Government works, and latterly the School Board have adopted them. They look well, the arris is good, there is little or no waste, the bricklayer can use them quickly and well, they have a smooth surface that will take plaster, and they will stand a very great crushing strain. On the other hand, they are made in a semi-dry condition, and will not stand the weather. They are baked, not vitrified, and, unlike the stock, will not stand fire. They absorb an enormous amount of water. A good comparison of the two classes of bricks may be seen—the Fletton brick in the Great Northern and Great Eastern railway works, as against the stock brick in the Tottenham and Forest Gate railway. The stock brickwork is quite as good as the Fletton, while as to durability the stock brick is beyond comparison.

Gault Bricks.—These were originally made for facing, but they suffer from the defect of staining or vegetation. They are now used as a common building brick. They have been very largely used in public buildings. They are more brittle than the Fletton brick, and are liable to fly and chip. They will not stand fire, and how they could have been allowed to be used in such public buildings as the new Admiralty buildings, the new Post Office, and more especially the National Gallery extension and the Public Record Office is a matter of great surprise to me. If ever a fire happens in these buildings, the public will regret that a Gault brick was ever allowed to be used.

As to the Leicestershire bricks there is not much to say. To a great extent the same remarks as to Gault and Fletton bricks apply to them.

With a knowledge of all four classes of bricks, I personally prefer the stock brick. In my opinion, it makes better work, it will stand the London atmosphere, for facing it is superior, and being practically a fire-brick and thoroughly vitrified, it will stand the fire where its competitors would disappear.

The matter is of such great importance that it would be of inestimable advantage to have a discussion upon it in your columns.

A LOVER OF A GOOD BRICK.

"SANDOWN" CASTLE.

SIR,—This structure, when erected on the wind-driven sand-dunes fronting Sandwich, was situate northward of "Shingle End," the termination, at that period, of this great Channel pebble belt, travelling upwards or to leeward as regards the prevailing south-west winds.

Some forty years back extended inquiries were made for Her Majesty's War Department, when the late Benjamin Hawes was Secretary for War. The information collected was printed and circulated amongst the owners of frontages affected, but no concerted action could be obtained for the necessary protection to check the great erosion north of Deal, at that time caused by the stoppage of the normal travel leeward of the shingle up Channel, due to several years' exceptional prevalence of easterly winds, as shown by the journals kept by the Trinity Corporation at the neighbouring light stations; and as the frontage of the War Department was limited, any large outlay was abandoned, as also the carrying out of any work for the protection alone of the Castle, at first entertained but ultimately put aside also.

Subsequently, when Sidney Herbert was War Minister, it was determined to abandon the Castle altogether as a military post.

Abandonment was easy; demolition more difficult; as proved even now by the efforts recently made to get rid of the remaining outlying portions.

I urged at the time that such a step might hereafter be regretted, and I still hold to that opinion, regarding it as a work assisting in the conservation of the shore, and great care, doubtless, has been exercised that the sub-structural portions which form a groyne for the retention of the travelling foreshore material, forming the defence of the northern portion of Deal, should not be removed.

It was then, as now, urged that as a military work it was chiefly remarkable as the prison of Colonel Hutchinson during the Civil War, but the monogram of the great Cecil, Elizabeth's trusted Minister, on the abutment of the draw-bridge, shows plainly enough the importance attached to it at that glorious period.

Deal, Walmer, and the other stone castles of Henry the Eighth are all on one uniform plan—a large circular main tower, surrounded by a deep fosse and four subsidiary outlying towers as the cardinal points, the main tower encircled by a subterranean arched passage with casemates commanding the fosse.

The geometric accuracy and beauty of the masonic work are marvellous, and would put to shame much of our modern vaunted handicraft work.

In the celebrated "Burleigh Book" in the King's Library at the British Museum these works are depicted on vellum with rare beauty, showing that the draughtsmen were as able as the masons who carried them out, and the whole volume is evidence that the monarch and statesmen of the Elizabethan Age were as anxiously foreseeing respecting the vast importance of every effort to conserve our insular maritime supremacy as their descendents can be in the Victorian Age.

Dymchurch Wall and the neigbouring shore have suffered much in the recent gales, but the plight of the former work can hardly be worse than what it was in just over half a century back, when the plan and sections made by me at that period, when Sir Edward Knatchbull was chairman of the Romney Marsh Commissioners, were hung up, and remained for many years in their meeting-room at New Hall, Dymchurch.

The large outlay comtemplated by some as necessary would hardly meet with much assistance if the value of the "Great Redoubt" is assessed by the War Office on the same principle as at Sandown Castle—*i.e.*, its extent of sea frontage defence as compared with the whole shore affected.

J. B. REDMAN, M.Inst.C.E.

BOILER EXPLOSIONS.

SIR,—In his letter on page 241, Mr. Francis E. Jones condemns the use of the hot-water cylinder in connexion with the kitchen boiler, but he gives no sensible reason for so doing. With the cylinder, especially if large enough, it takes longer to cause the water to boil. Also when the water gets warm it takes longer to cool a large body than a small. Further, the warmer portion of the water rises to the top, hence if the expansion-pipe rises upwards in every part of its course from the cylinder it requires the fire to be off a long time before the expansion-pipe can freeze.

It often happens, however, that the expansion-pipe is not put up properly at first, and not fixed securely so as to always have a rise upwards in all its course, hence a check is put to the easy rise of the warm water in the expansion-pipe, and its unnecessary greater liability to freeze.

The supply and expansion pipes to and from the boiler and cylinder should be wrapped with felt, so as to help to prevent freezing. Were this oftener done and greater attention paid to the rise upwards of the expansion-pipe *in all its course* many explosions might never have occurred.

The double pipes between the cylinder and the boiler should give greater safety, not extra danger, as Mr. Jones insinuates.

A safety-valve on the cylinder would tend greatly to prevent explosions.

To cause explosion a little portion of the water frozen in both the supply and expansion pipes is all that is necessary, if fire is kept on with those two pipes partly frozen, for then the steam cannot get away.

W. P. BUCHAN.

The Student's Column.

THE STRUCTURE AND PHYSICAL PROPERTIES OF BUILDING STONES.—XIII.

DISTRIBUTION OF ENGLISH OOLITES.

THE whole of the Oolitic limestones raised in this country, and a great number of shelly limestones also, are found within the dotted zone delineated on the accompanying map (fig. 13). The numbers therein, refer to districts where the stone is actively exploited, and may be defined as follows:—

1. Purbeck. 2. Portland. 3. Tisbury. 4. Ham Hill. 5. Doulting. 6. Bath. 7. Cotteswolds. 8. Oxford. 9. Kettering. 10. Stamford. 11 Ancaster. 12. Yorkshire.

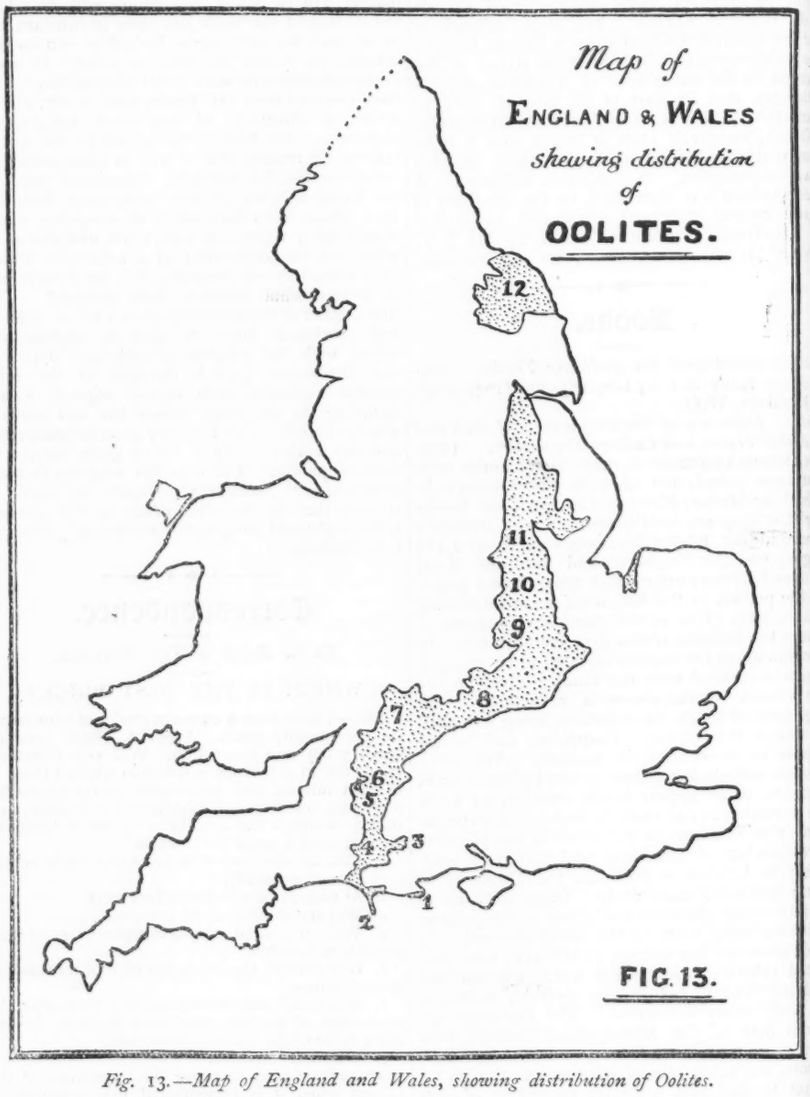


Fig. 13.—*Map of England and Wales, showing distribution of Oolites.*

I.—THE PURBECK DISTRICT.

The building, paving, and kerbing stones quarried in the Isle of Purbeck come from the Purbeckian and Portlandian series. The following sketch-map indicates the sites of the various workings:—

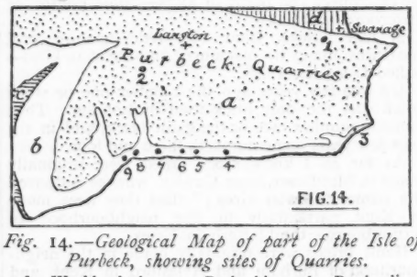


Fig. 14.—*Geological Map of part of the Isle of Purbeck, showing sites of Quarries.*

d = Wealden beds. *a* = Purbeckian. *b* = Portlandian. *c* = Kimeridgian.

These quarries may be divided into two groups, according as they are situated on the Purbeck or Portland beds, and the stone is capable of a like separation. Referring to the former group first, we may say there are about fifty quarries in the Purbeckian of the district extending from Swanage to beyond and north of Langton. They are chiefly small workings, employing altogether close upon 200 men, and, in addition, 100 men are engaged as masons. All the quarries are in reality mines, 60 ft. or thereabouts from the surface, worked by means of an inclined shaft, the stone being drawn up by a horse-windlass. We descended into certain of these mines, and ascertained that the men have frequently to work in a stooping posture, or by lying on the wet ground, whereby they easily contract rheumatism. To quote the words of a middle-aged quarryman:—"My health has been ruined by underground work in these quarries, and, in consequence, I am made an old man before my time." Candles are the only illuminants used. Quarrymen employed underground are paid by the day; masons above by piecework; there are no trades unions.

It would serve no useful purpose for us to describe each of these small workings; the following generalised section shows the whole of the workable beds in order of their occurrence. It will be understood that these beds are not worked in any one quarry, but that the information is derived from several:—

Generalised Section of Quarried Purbeck Beds, in the Isle of Purbeck.

	ft.	in.
Rubble and odd stone (not worked)		
"Laning Vein." Yellowish grey limestone, large shells in layers, and very hard	4	0
Clay parting.		
"Roach." Grey, hard, laminated, shelly limestone; used for flagging	0	9
Clay parting.		
"Grey" bed. Light blue, hard, shelly limestone; used as steps for cottages, &c.	0	7
"Thornback" bed. Dark grey, very fine-grained, and hard enough to be		

	ft.	in.
polished; used for caps, kerbing, bedstone, &c.	0	10
"Purbeck freestone." White, grain so fine as to be hardly visible; used for general building purposes, mouldings, &c. This will be described in detail later on	2	0
Clay and rubble beds (not worked).		
"Downs Vein." Grey, shelly limestone; used for paving	4	0
Clay bed.		
"Cinder" stone (not worked).		
Clay bed.		
"Cap and Feather" bed. Light brown, fine-grained, irregularly-fractured limestone; used for kerbing	4	0
"New Vein." Very hard limestone; used for steps, paving, square landings, &c. Stones 5 ft. to 6 ft. square, and larger	4	0
Total thickness worked	20	2

The freestone is said to have a "bed" in it, but we discovered that in this district quarrymen call a "bed" any plane along which the stone readily splits, and that there is no real bed or horizontal joint in it. Judging from the readiness in which large flakes were detached by masons, we came to the conclusion that, although hard, it was somewhat brittle. Thin calcite veins run through the blocks here and there, but do not detract from the value of the material. The freestone does not apparently "vegetate," and keeps its colour well.

The following sketch (fig. 15) illustrates the

FIG 15.

Fig. 15.—*Micro-structure of Purbeck Freestone.* (x 40).

micro-structure of Purbeck freestone, obtained from the point marked 1 on the map (fig. 14). It is made almost entirely of shelly matter, indicated by the long, irregular fragments, cemented together by calcite in a more or less granular condition, and having a certain amount of secondary quartz or flint distributed amongst it. The shells bear signs of having been partially decomposed and then re-cemented. Quartz grains very rare.

A micro-examination of a sample of the Purbeck freestone from point 2 (fig. 14) shows that the stone is finer grained, matrix more granular, and quartz grains (sand) fairly abundant.

The "Thornback" bed, so largely used for caps and kerbing, differs in structure (fig. 16)

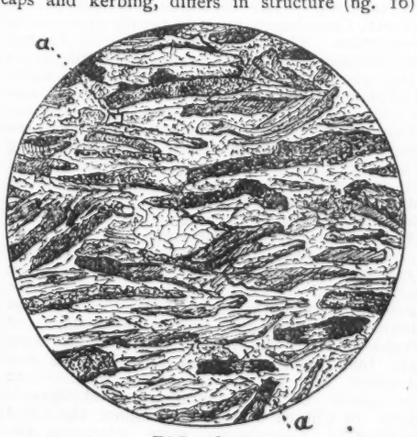


FIG. 16.

Fig. 16.—*Micro-structure of Purbeck stone ("Thornback" Bed).* (x 40).

a, *a*=Quartz grains.

from the freestone, amongst other things that it contains much more quartzose sand, has not such a granular matrix, whilst the shelly matter is more comminuted and fresher.

GENERAL BUILDING NEWS.

PROPOSED RECONSTRUCTION OF STAFFORDSHIRE GENERAL INFIRMARY.—A special meeting at the Staffordshire General Infirmary was held recently, when the Earl of Harrowby, the chairman, said he had no hesitation in recommending that the Building Committee should at once proceed to reconstruct the hospital, upon the plans of Mr. Aston Webb. The central portion would remain as the administrative block. The old wards would disappear, and be replaced by a new wing. They would have in the place of the old building a model hospital, equipped fully with every modern appliance. The recommendation was agreed to.

CO-OPERATIVE PREMISES, TOTTERDOWN.—New premises have been acquired by the Bedminster Industrial Co-operative Society, Limited, at Highgrove-place, Totterdown, and these were opened on the 15th inst. The building consists of basement and ground-floor, and has a frontage in Wells-road of about 46 ft., and a side front in County-street of about 140 ft. The entrances are laid with tesselated tiles, the shop floor being constructed with rather a sharp gradient to avoid steps. The plans and specifications were prepared by Mr. John Reed, and carried out under his supervision. The work was entrusted to Mr. T. Broad, of Totterdown.

NEW PARISH HALL, CLERKENWELL.—According to the *Daily News* Mr. Evans-Vaughan, of Lowther Arcade, is appointed architect for the new hall, and the contract for 14,724*l.* 18s. of Messrs. C. Dearing & Son, of Islington, is accepted. The original estimate of 12,000*l.* the vestry decided to increase by 910*l.* for extra cost involved by paying the trade union rate of wages and using English goods.

SCHOOLS, LLANELLY.—New schools to accommodate 550 children have just been completed for the Llanelly School Board from plans prepared by Mr. J. B. Morgan, of Llanelly, who has also had further instruction from the Board to provide additional accommodation for 500 children.

CHURCH HALL, SHIPLEY.—The new Parochial Rooms, or Church Hall, which are the forerunners of the church for the Saltaire end of the parish of Shipley, were recently dedicated. The new buildings are situated off Moorhead-lane, east of the new church site, and contain a central hall and two class-rooms. Messrs. T. H. & F. Healey, of Bradford, have been the architects, and Messrs. Rhodes Brothers the principal contractors.

NEW INSTITUTE AT BROMSGROVE.—Mr. Austen Chamberlain, M.P., opened recently the new Institute, on the New-road, Bromsgrove, the foundation-stone of which was laid by Lord Windsor last autumn. The total cost of the new premises is nearly 2,000*l.* The architect was Mr. John Cotton, late of Bromsgrove, and now of Oxford. The building occupies a site adjoining the Cottage Hospital, and is approached by a flight of steps from the New-road. There is a vestibule and hall about 6 ft. wide. On the left is a reading-room 24 ft. by 18 ft. 6 in., with a segmental bay window; and on the left is the lending library. At the far end of the hall is a lecture-room, which will also be available for gymnasium purposes; the dimensions are about 42 ft. long by 24 ft. 6 in. wide; the roof is open-timbered, and a small retiring-room is provided. Upon the first floor, above the library and reading-room, are two large rooms for recreation purposes, committee meetings, &c. The premises are built with brick and roofed with tiles, and are relieved by stonework round the entrance and over the windows. The design is of a Gothic type, and the elevation is so arranged that when the new School of Art is erected on the adjoining site, the whole will harmonise. Messrs. Tüt & Weaver, of Bromsgrove, were the builders. Messrs. Griffin Brothers, of Bromsgrove, did the stonework, and Mr. H. H. Martin, of Cheltenham, the carving from the architect's sketches and instructions.

ALTERATIONS TO LOSTWITHIEL CHURCH, CORNWALL.—Lostwithiel parish church is, says the *Western Morning News*, undergoing considerable alterations. The clergy and choir vestry immediately behind the organ, in the north aisle, was very inconvenient, and for the enlargement of the organ this space was required. The most suitable site for the new vestry was found to be in the north-west corner under the spire. Mr. J. Stephens is doing the masonry, and Mr. J. Rundle the carpentry. Mr. E. Sedding, of Plymouth, is the architect. The vestry will cost about 200*l.* When it is finished the north-west arch of the spire, which has been blocked, will be opened, so that the way from the vestry into the church will be through the belfry to the central aisle. What was in past years known as St. George's Chapel, situated at the south-east corner of the church, is being restored.

MUNICIPAL BUILDINGS, COATBRIDGE, LANARKSHIRE.—On the 26th inst. Mr. Graeme A. Whitelaw, M.P., laid the memorial stone of the new municipal buildings of Coatbridge. Mr. A. M'Gregor Mitchell, Burgh Engineer, is the architect of the buildings.

ALTERATIONS TO WESLEYAN CHAPEL, LELANT, CORNWALL.—Lelant Wesleyan Chapel was re-dedicated on Good Friday after alterations. The entrance lobby is now approached by granite steps, and the floor is laid with tesselated pavement. The lobby screen is of pitch-pine moulded panels. The chapel is fitted with pitch-pine benches, with sloped backs. The gallery is reseated to correspond with the body of the chapel. The orchestra is entirely new, and forms an apse in the east end. The decorations have been carried out by Mr. Richards, of St. Ives. The contractor is Mr. Glasson, Curbes Water, who sublet the mason work to Mr. Fox, of Goldsithney. Mr. O. Caldwell, Penzance, is the architect.

NEW BANK PREMISES AT YORK.—New premises for the York branch of the National and Provincial Bank of England have been erected at the corner of Market-street and Spurrier-gate, York. A considerable widening of the narrow roadway has been effected by setting back the building line. The front elevations are of Pateley Bridge stone, and the banking-room occupies most of the ground floor. Provision is made for both gas and electric lighting. The building is Classic in design, and has been constructed entirely to the plans prepared by Mr. G. H. Gribble, architect, London. Mr. T. P. Barry, of York, was the contractor; and Mr. Edward Grimes, clerk of works.

THE RESTORATION OF ARBROATH PARISH CHURCH.—A meeting of the joint-committee for the restoration of the Old Church of Arbroath, destroyed by fire about eighteen months ago, was held on the 21st inst. Mr. Burnett, architect, Glasgow, submitted tenders for the rebuilding of the church according to plans prepared by him. Tenders to the total amount of over 6,000*l.* were accepted. The work is to be proceeded with immediately. The church spire, which was not damaged by the conflagration, will form a corner tower to the new building.

BAPTIST CHAPEL, BEDFORD.—On the 21st inst. the foundation-stones of the new Providence Baptist Chapel in Rothesay-road, Bedford, were laid. The length of the chapel will be 77 ft., and its width is 44 ft. 6 in., but there is also a building in the rear, containing on the ground floor a vestry, lobby, hall, committee room and two class-rooms. On the floor above there will be one schoolroom, 41 ft. 6 in. by 27 ft., with a height of 24 ft The front elevation of the chapel faces Rothesay-road. Within, there will be a pulpit and baptistry at one end, a gallery at the other, and seating accommodation for about 550. Messrs. Usher & Anthony, of Bedford, are the architects, and Messrs. Melcombe Bros. are the contractors, also of Bedford.

ADDITIONS TO ST. PETER'S CHURCH, FOLKESTONE, KENT.—The chancel and side chapel of this church was reopened at Easter, upon the completion of some decorations which have been in course of execution for several weeks past. They consist of the erection of carved and traceried oak-work, which covers the walls of the chancel and side chapel, and consists of wall panellings, canopied choir-stalls, sedilia, credence, doors and their surroundings, and an altar-piece to the side chapel, with a folding triptych as a central feature, and the part above carried to a considerable height, and terminating beneath the roof-plate in a coved canopy. The whole is carried out in oak in the style of the end of the fifteenth century, and has cost about 1,000*l.*, defrayed out of the estate of the late Miss Philips, of Leamington. The work has been executed by Mr. Richard Bowen, of Leamington, from the designs and under the supervision of Mr. Slingsby-Stallwood, F.S.A., of Reading.

PROPOSED WESLEYAN CHAPEL, WOLSTANTON.—A new Wesleyan Chapel is about to be erected at Wolstanton, Staffordshire, the architect being Mr. A. R. Wood, of Tunstall, whose design has been selected in a limited competition.

PROPOSED CONSERVATIVE CLUB, CHATHAM.—The Executive Committee of the Conservative party of Chatham have decided to recommend the purchase of a site for the erection of a new club, and have instructed Mr. G. E. Bond, architect, to prepare plans for the building.

SANITARY AND ENGINEERING NEWS.

SEWERAGE SYSTEM, MANCHESTER.—Mr. T. Codrington, Local Government Board Inspector, held an inquiry at Manchester on the 15th inst. with respect to an application by the Corporation to borrow 100,000*l.* to complete the sewerage system started in the city some years ago.—Dr. Pankhurst, for the Corporation, said that under an order made in 1890 an area of 6,969 acres had been added to the city, and the population upon it would soon reach 165,000. I was necessary to make provision for the added districts. Formal evidence was given, and the inquiry was closed.

SEWERAGE WORKS, WIMBLEDON.—On the 21st inst., Colonel John Ord Hasted, R.E., Inspector of the Local Government Board, held an inquiry in respect of the application of the Wimbledon Local Board to borrow 1,650*l.* for works of sewerage and sewage disposal, in accordance with plans prepared by Mr. C. H. Cooper, Engineer and Surveyor to the Board, and 825*l.* for the purchase of land for additions to the recreation ground. The works of sewerage

include a small scheme for the drainage of the north-eastern portion of the district, which is at too low a level to gravitate to the sewage works. It is proposed to raise the sewage of this district by means of two small Shone's ejectors, worked by compressed air, after the same has already done duty in pressing sludge at the sewage works. The works of sewage disposal relate to the high-level filters, which at present cannot be worked alternately, and are, therefore, constantly submerged, so as to prevent nitrification taking place. It is proposed to alter these filters so that they can be used alternately, and allow one filter to aërate while the other is in use for the filtration of sewage.

SEWAGE SCHEME, STOCKPORT.—On the 17th inst. the Mayor of Stockport (Mr. John Turner) cut the first sod, and Mr. Alderman W. Lees, chairman of the Sewage Outfall Committee, laid the first stone of the works at Cheadle Heath, connected with the scheme for intercepting and purifying the sewage of the borough of Stockport. The scheme, which is that of Mr. A. M. Fowler, of Manchester, formerly Borough Surveyor of Stockport, is designed to deal with the whole sewage of the borough and the out-townships immediately adjoining. The sewage of the borough is to be intercepted, and, along with a portion of the heavy rainfall which passes through the sewers, is to be prevented from entering the River Mersey. The whole volume of these sections is to be passed through one arterial sewer, so as to secure, even in times of prolonged drought, a velocity sufficient to keep the sewer self-cleansing. The area of the borough of Stockport is 2,167 acres, and its population is 72,053; and the scheme is calculated to meet the combined requirements of that area and the townships already referred to for many years to come. The total length of the intercepting sewers will be about 4½ miles, and the main sewer will be built of brickwork of such a form and inclination as to ensure a velocity of upwards of 2 ft. per second and of varying diameter, with a maximum of 7 ft. and a minimum of about 18 in. The underground work will be partly through gravel, but principally through rock, and will be generally 40 ft., and in many places as much as 69 ft. below the surface. The main sewer will be ventilated throughout its entire length, and will always be accessible and under complete inspection. Out at Cheadle Heath, on the left bank of the Mersey, and in immediate proximity to the stream, the sewage will be dealt with by being pumped to a height of 17 ft., there to be incorporated with the precipitating medium which will throw down the solids. It will then pass into eight tanks, where the mud will be intercepted, and the effluent therefrom will be passed on to and over about 63 acres of land, and there allowed to rest at intermittent periods. The land will be under-drained, so that the water will fall into the river in, it is claimed, a clear condition. The buildings upon the site will consist of a pumping-house to contain the necessary motive power, processes for pressing the mud into cakes, and rooms for grinding the chemicals for treating the sewage. It is estimated that the works will cost 95,000*l.*, exclusive of the land.

LANDING-STAGE IMPROVEMENTS AT LIVERPOOL.—At the meeting of the Mersey Docks and Harbour Board, on the 22nd inst., a recommendation of the Works Committee to provide additional landing and railway accommodation at the north end of the Prince's Landing-stage, for the coast-wise, cattle, and goods traffic, at an estimated cost of 120,000*l.*, came up for consideration. The alterations contemplated are an extension northwards of the Prince's Landing-stage for a length of 400 ft., a new jetty from the south side of the south entrance to the Prince's Half-tide Dock to the north end of the floating landing-stage, as extended, a bridge to connect the said stage and jetty, a platform supported on piles in a portion of the space between the landing-stage, as extended, and the river wall, and railway lines in connexion with the proposed jetty, and having a junction with the dock, lines of railway across a new bridge to be provided over the passage between the Prince's Dock and Half-tide Dock. The Board confirmed the recommendation unanimously.

SEWAGE SCHEME, ASHTON-UNDER-LYNE.—Colonel Ducat, R.E., Inspector to the Local Government Board, held an inquiry last week at the Ashton Town Hall for a loan of 45,000*l.* to carry out sewage purification works. Mr. Shee, Q.C., and Mr. Mattinson, appeared in support of the Corporation. By this scheme it is proposed to purify and deal with the sewage of Ashton, Hurst, Littlemoss, and Taunton. The scheme was opposed by the Dukinfield and Audenshaw Local Boards, not on the grounds of inefficiency, but on account of Ashton wishing to take its sewage into another county. The system intended to be adopted is that known as the International process. The inquiry lasted for five days, and was of some importance, as it will probably settle the question whether or not public authorities will in the future be permitted by the Local Board to take their sewage into a neighbouring county for treatment.

STAINED GLASS AND DECORATION.

WINDOW, NORTON LINDSEY, WARWICKSHIRE.—The three-light window on the south side of the nave of Norton Lindsey Church has just been filled with stained glass, the subject of the Crucifixion being taken across the entire window, which has been designed and executed by Messrs. F. Holt & Co., of Warwick.

MEMORIAL WINDOWS, ST. ANDREW'S CHURCH, BRADFORD.—On the 17th inst. three memorial windows in St. Andrew's Church, Listerhills, Bradford, were unveiled by the Rev. Canon Bardsley, D.D., Vicar of Bradford. The windows have been executed in the fifteenth-century style by Messrs. Powell Bros., Leeds.

FOREIGN AND COLONIAL.

FRANCE.—M. Olivier Merson has been appointed professor of drawing at the École des Beaux-Arts, in place of M. Joseph Blanc, who has undertaken other duties. M. Ernest Barrias is appointed chief professor in the atelier of sculpture, in place of the late M. Cavelier.——The inauguration of the monument to Barye will take place on June 15, under the presidency of M. Guillaume, director of the École Français at Rome.——There is talk of cleaning and restoring the large frescoes in Grisaille by Abel de Pujol, in the Bourse at Paris.——The municipality of Peronne have opened a competition for a monument to a nearly-forgotten heroine, Marie Fourré, who, in the sixteenth century, saved Peronne when it was besieged by Henri of Nassau. M. L. Ruse, architect, of Paris, has given the sum to be expended in premiums.——A bust of La Fontaine, by M. Louis Noël, is to be inaugurated on June 24 at Fontenay-aux-Roses.——The State has just purchased the church of St. Laurent at Rouen, an interesting example of the architecture of the fifteenth century, which had passed into the hands of a private owner who wished to pull down the nave in order to build a house on the site, preserving only the entrance-door and tower of the ancient church. The building thus rescued is to be classed among the "Monuments Historiques."——M. Alesmonières, engineer, of Thonon, has obtained the first premium in a competition opened by the municipality of Evian for sanitation works in that town, including water supply and the construction of public drinking fountains. The second premium has been awarded to M. Goupil, architect, of Narbonne, and the third to M. Masson, engineer, of Paris.—A monument to Dupré, the eminent landscape-painter, is to be placed on the Ile Adam. It will be completed in June.——The death is announced, at the age of sixty-four, of the landscape-painter Felix Bernard, pupil of Hippolyte Flandrin. He carried off the Prix de Rome for landscape in 1854.——M. Louis Cardon, editor of the *Evènement*, is dead at the age of thirty-three. He was one of the youngest and at the same time one of the best art-critics on the Parisian Press.—— The widow of the eminent sculptor Carpeaux is organising an exhibition of the works of her late husband, to be held from May 19 to 25, at the Ecole des Beaux-Arts. The exhibition will include, besides sculpture, a number of drawings, paintings, portraits, and some very curious sketches and studies of the court of Napoleon III.——A subscription has been opened at Moulins to raise, in that town, a monument to the poet Théodore de Banville.——Mdme. Rosa Bonheur has been made "officier" of the Legion of Honour. She had a long time since received the cross of "chevalier."——The title of chevalier has been conferred on M. Frantz Jourdain, member of the Société Centrale des Architectes.—— The construction of the large intercepting sewer at Asnières has led to the discovery of a subterranean passage, vaulted in stone, five kilomètres long, and which forms a communication between Asnières and the cellars of the ancient château of Gennevilliers. Its existence was quite unknown to archæologists who have interested themselves in the history of the château. It is supposed to have been constructed in the time of Louis XV.——The rebuilding of the Pont de Neuilly, which has been considerably enlarged, has just been completed.

GERMANY.—The conditions of the competition for the Emperor's "Classic Art" prize are now published. The competition is limited to German subjects, and the sending-in day will be in December. The Emperor himself will act as sole adjudicator.——The monument to Emperor William I. on the Kyffhauser is to be completed by May 10, 1896, which is the twenty-fifth anniversary of the conclusion of the Peace of Frankfort. The total cost will be about 45,000*l.*, of which nearly 13,000*l.* has still to be subscribed.——The result of the competition for this year's Schinkel commemoration prizes was recently announced at the general meeting of the Architekten Verein. In the Architectural section, where a design for a club house was the subject, two only, of the seven plans sent in, were adjudged worthy of distinction, Herr Hennig taking the prize and Herr Körner the medal. In the Engineering section the subject was a canal swing-bridge. Three designs were received, and Herr Skalweit was awarded the first premium.——At the Berlin Art Exhibition, which opens on May 3, "Arts and Crafts" will be well represented, especially gold and silversmiths' work and wood-carving. The Carlsruhe artists have sent in nearly fifty pictures.——The Society of Lady Artists opened their exhibition at the Academy of Arts last week. The jury, it is worth note, is exclusively composed of artists of the other sex.—— The Municipal "Special Commission" appointed to act in conjunction with the executive of the Berlin Exhibition of 1896 has decided to invite the members of the Works Committee to a conference with a view to settling the scope of the exhibition.——1,000*l.* has already been subscribed towards the proposed Siemens monument at Berlin.——The proposals for the Dortmund and Rhine Canal will come before the Prussian Diet after the Easter recess. The cost of the undertaking (approximately 3,000,000*l.*) and the powerful interests in opposition to the scheme, render its acceptance doubtful.——Herr Karl Gries, an architect, who, strange to say, in the course of his practice, has accumulated a large fortune, has just made the City of Munich a gift of some house property, valued at about 75,000*l.* The property is to be sold and the money spent on some new baths and washhouses. Herr Gries is now in his seventy-fourth year, and is well known for his philanthropic work.—— The historical "Römer" building at Frankfort is to be restored at a cost of over 8,000*l.* The original design of Herr Meckeh, who took the first premium in the competition some five years back, had to be modified to almost half its extent.——The very successful results of the excavations undertaken by the German Archæological Institute at Athens have induced the Greek Government to purchase the land on the western side of the Acropolis, with a view to further investigations.——At a recent meeting of the Archæological Society, Messrs. Kekule and Kern lectured on the excavations undertaken by the executive of the Royal Berlin Museums at Magnesia on the Mæander. Works went on from March, 1891, to July, 1893, under the direction of Herr Humann, the principal discoveries being the Temple of Artemis, the Agora, and the Temple of Zeus Sosipolis.——The architect Bernhard Schreiber has died at Dresden. He was an honorary member of the Dresden Academy of Arts. His chief work is the Court Theatre at Neustadt.——Professor Hoffmeister, one of the most promising of the younger Berlin sculptors, has died at the age of forty-four. He was born at Potsdam, and studied at the Berlin Academy. His chief works are a fountain at Erfurt, designed in conjunction with the architect Stöckhardt, and the Hausemann monument at Aix-la-Chapelle.

AUSTRIA.—The works on the new Hofburg at Vienna will be proceeded with as soon as the weather permits. By the end of the building year it is intended to attain to the roof level, and to reserve the construction of the connecting wing to the Old Palace for 1895, when a commencement will also be made on the internal arrangements. The Royal apartments are to be ready for occupation in 1900.——Vienna is to have yet another new theatre, this time in the "Landstrasse" quarter. The building will have 2,000 seats, and will cost half a million florins. The architects will be Messrs. Fellner & Helmer.

SPAIN.—There is to be yet another "International" Exhibition this year, at Madrid, from June 1 to October 31, under the patronage of the Queen Regent There will be an International Committee, and the usual facilities as to customs, duties, and freights will be afforded to exhibitors. The following are the different sections:—1. Liberal Arts; 2. Hygiene, Sports and Pastimes; 3. Chemical Industries; 4. Arts and Crafts Furniture; 5. Devotional Attributes; 6. Textile Industries, Clothing, and Manufactures; 7. Metallurgy, Forestry, and Stonework; 8. Engineering, Architecture, and Public Works; 9. Machinery; 10. Electricity; 11. Transport and Exchange; 12. Articles of Nourishment; 13. Agriculture; 14. Miscellaneous. An International Jury will adjudicate.

DENMARK.—The decorations in the Marble Church, Copenhagen, are now rapidly approaching completion. The Italian workmen have finished the polishing of the mosaic floor, the heating apparatus has been installed and works satisfactorily. The main entrances are now being completed, and it is expected that the church will be consecrated at Whitsuntide. A new communal school has been completed at Frederiksværk, the cost being 53,000 kr., and the architect is Herr Holck.——It has been decided to erect a museum for antiquities at Hjörring.——The Copenhagen Muncipality has determined to form the district around the Free Harbour, now being constructed, into a separate quarter of the city, to be called the "Free Harbour Quarter." In this quarter buildings are now springing up in all directions.——It has been decided to rebuild the ancient Vallö Castle, burned down some time ago, under the guidance of Professor Hans J. Holm. The original castle was built some 300 years ago, and the new structure will be in the same style.——In the course of the restoration of Helligaands Kirke or Church of the Holy Ghost, the oldest building in Copenhagen, some interesting discoveries have been made. In 1728 the building was partly destroyed by fire, and by knocking off the stucco it has been discovered that whilst the original building was constucted of large red bricks, so-called "monk" stones, yellow "Fleurborg"

bricks had been used in the restoration. Moreover, on removing the stucco from the piers in the church it has been discovered that they are really handsome square polished columns, which have been enclosed within a foot of the brickwork. The original floor of large red tiles has been found a foot below the present one. Below are extensive burial vaults. The building will be restored exactly in accordance with the appearance of the original. The edifice was in the Middle Age one of the most important monasteries and hospices in Denmark. The work is being conducted by Professor Storck, and the cost will at least be 100,000 kr.——An interesting work has just been published in Copenhagen upon the buildings of the Danish provincial archives, with illustrations and plans. The buildings, which are three, are undoubtedly some of the most original in Denmark, and quite modern, having been erected in 1890-93. They are situated in the towns of Viborg (Jutland), Copenhagen, and Odense (Island of Funen). The cost has been respectively 150,000 kr., 250,000 kr., and 140,000 kr.——A great engineering work is now in progress in Denmark—viz., the construction of a new bridge, in place of the wooden one, across the broad Guldborg Sound, on the route to the Continent. The new bridge will be situated by the side of the old one, and have eighteen piers, consisting of iron cylinders filled with concrete.

NORWAY.—A committee has been formed in Bergen for the establishment of a permanent exhibition of arts and industries.——The annual Norwegian State Art Exhibition is now open in Christiania.——The Christiania Association of Engineers and Architects has unanimously passed a resolution condemning the present arrangement of technical education in Norway, and insisting upon an immediate reform. ——Several new business premises are being added just now to the central parts of "modern" Christiania. Among them is a huge building, in the construction of which Norwegian stones have solely been employed, viz., polished light "Labrador" for the facing of first and second stories, and greyish white marble for the two upper stories. The architect is Herr Henr. Nissen.

MISCELLANEOUS.

WALL PAPERS.—Messrs. Jeffrey & Co. will have on view during April, at their rooms in Essex-street, Islington, some new designs for wall papers by Mr. Walter Crane, Mr. Sydney Vacher, Mr. Lewis F. Day, Mr. Stephen Webb, Mr. Heywood Sumner, and Mr. C. F. A. Voysey.

DISCOVERY OF FRESCO PAINTINGS IN POUGHILL CHURCH.—A few days ago some workmen were carrying out interior renovations at Poughill Church, near Bude, when traces of fresco paintings were discovered, both in the north and south aisles, worked upon a coat of plaster on the walls. That in the north aisle is a large picture measuring about 12 ft. by 9 ft., and is said to be a work of the very early part of the sixteenth century. It is a representation of St. Olaf, the patron saint of the church. The fresco abounds in maritime detail, the cliffs, vessels, fish, mermaid, and men in a boat in rowing attitude being all clearly depicted. The border round the painting is about 9 in. wide, and bears a resemblance to the carved borders to be found on the bench ends of the church, also the work of this early period. The fresco in the south aisle is about 11 by 8 ft., and is a representation of St. Christopher (the Christ bearer). This fresco is also full of detail in illustration of the old legend. It represents the saint upholding the universe, and in the act of carrying our Lord across the water. Other children are represented as awaiting the saint's care, and the Virgin stands out prominently with her hand outstretched to light the way.

THE SANITARY INSTITUTE.—At an examination for Inspectors of Nuisances, held at Nottingham, on Friday and Saturday, March 16 and 17, thirty-three candidates presented themselves. The following nineteen candidates were certified, as regards their sanitary knowledge, competent to discharge the duties of Inspectors of Nuisances:—Ball, James Maxwell, Buxton; Davis, George Walter, Stuffynwood, Mansfield; Forster, John Smith, Stockport; Franks, Frederick William, Nottingham; Granger, Francis, Nottingham; Hawley, George William, Nottingham; Hughes, Albert Hanmer, Rhosddu, Wrexham; Jackson, Leonard Labrey, Garstang, Lancashire; Levy, Jacob, Nottingham; Oliver, Ralph Hudson, Glossop; Peers, John, Lower Broughton, Manchester; Reeve, Isaac, Beeston, Notts; Slater, William, Nottingham; Spencer, Walter, L.R.C.P., Retford, Notts; Stake, Tom, Stanningley, Leeds; Tadman, Percy Charlton, Batley, Yorkshire; Thompson, Frederick, Sunderland; Westwick, Louis Alfred, Mansfield; Whitbread, Richard, Carlton, Nottingham.

INSTITUTE OF CERTIFICATED SANITARY INSPECTORS.—The second annual meeting of this Institute was held on the 22nd inst. at "The Parkes Museum," Margaret-street, W., when the Chairman of the Council, Mr. W. H. May (City of London) in his opening remarks gave an account of the work and progress of the Institute during the past year, and stated that although the expenses had been very considerable, the Institute was financially in a better position than at their last meeting. The number of Honorary Fellows had been increased by the addition of several of the best-known sanitary scientists of the present day, but if ladies could only be persuaded to assist by taking up the practice and teachings of hygienic science—say in the formation of a Sanitary Primrose League — a very great step in the right direction would be made. The President of the Institute, Professor Wynter Blyth (Medical Officer of Health, Marylebone), then read a paper upon "The Education of the Sanitary Inspector —Past, Present, and Future." In the course of the paper, Dr. Blyth said that he considered that there should be an extension of the system of instruction inaugurated by the Institute in the way of technical training for some of the posts connected with the inspection of factories. There were many grades of factory inspectors, and some of these might be filled well by officers in the sanitary service. To facilitate this he desired much to see a course of special instruction initiated with regard to factories and workshops; something of this kind had been commenced in the admirable series of industrial hygiene lectures of last session, but they were too few in number and too restricted. He looked with approval on the appointment of lady sanitary officers; these had been appointed in Brighton, in Kensington, and in Nottingham, and in a few other places. So long as there were millinery establishments needing supervision, factories employing female labour, underground sanitary conveniences for women, and infant crêches, their services could be utilised, but he considered that the training should be equally severe as for male appointments, and that they should pass a qualifying examination. In practical work he drew a distinction between two classes of nuisances; the one technical, not causing injury to health, the other serious. If a single technical nuisance existed in a house, such, for example, as a dustbin wanting a lid, he disapproved of official action, considering that this belonged to "fussy sanitation"; and if every little thing was to be officially controlled, sanitary inspectors would become a greater nuisance than the nuisances they were called upon to abate.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY.—A paper was read before this Society on the 29th inst. by Mr. A. Fairlie Bruce on "Cement and Concrete Testing as carried out for the Glasgow Corporation Waterworks." The author gave details of the method of weighing, mixing, gauges used for ascertaining the degrees of fineness to which the cement was ground, testing machine used, method adopted for detecting the existence of free lime, and several tables of results. He entered fully into the general question as to the proper proportions for the aggregate and cement, and gave a formula for ascertaining the growth of the strength of cement; this was arrived at only after a long series of experiments. The question of the best sand for mixing with cement was gone into, the author preferring sand derived from crushing Whinstone or Sandstone to either pit or river sand.

MEETINGS.

FRIDAY, MARCH 30.

Architectural Association.—Discussion on the London Streets and Buildings Bill. 7.30 p.m.

SATURDAY, MARCH 31.

Junior Engineering Society.—Visit to the Tower Bridge; meeting on Middlesex side. The President, Mr. J. Wolfe Barry, Engineer of the Bridge, will show the members over. 3 p.m.

Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XI. 3 p.m.

MONDAY, APRIL 2.

Surveyors' Institution.—Adjourned Discussion on the paper read by Mr. Howard Martin, at the last meeting, on "The Report of the Local Government and Taxation Committee of the London County Council on the Subject of the Rating of Ground Values." 8 p.m.

Society of Engineers.—Mr. E. Lloyd Pease on "Gasholder Construction." 7.30 p.m.

Society of Arts (Cantor Lectures).—Captain W. De W. Abney on "Photometry." I. 8 p.m.

Junior Engineering Society.—Mr. F. R. Taylor on "The Industries of Devon and Cornwall." 8 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers).—Dr. Louis Parkes on "Sanitary Laws and Regulations Governing the Metropolis." 8 p.m.

Victoria Institute.—Paper on "Babylonian Exploration." 4.30 p.m.

Leeds and Yorkshire Architectural Society.—(1) Nomination of Officers; (2) Smoking Concert. 7.30 p.m.

TUESDAY, APRIL 3.

Institution of Civil Engineers.—Mr. Charles Hunt on "The Construction of Gas-works." 8 p.m.

Royal Institution.—Professor J. A. Fleming, M.A. on "Electric Illumination." I. 3 p.m.

Glasgow Architectural Association.—Mr. Allan Graham on "Byzantine Architecture." 8 p.m.

WEDNESDAY, APRIL 4.

British Archæological Association.—(1) Dr. Winstone on "Epping Forest in Pre-historic Times." (2) Dr. A. C. Fryer on "American Tumuli." 8 p.m.

Society of Arts.—Mr. C. F. Binns on "The Elements of Beauty in Ceramics." 8 p.m.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting of the Members. 8.30 p.m.

Edinburgh Architectural Association.—(1) Mr. P. Miller, F.S.A. (Scot.) on "The First Wall of Edinburgh, or King's Wall, and some evidence relating thereto"; (2) Mr. G. S. Aitken, F.S.A. (Scot.) on "The Ancient City Walls of Edinburgh and Modern Edinburgh." 8 p.m.

Institution of Civil Engineers of Ireland.—Meeting at 35, Dawson-street, Dublin. 8 p.m.

THURSDAY, APRIL 5.

Royal Institution.—Mr. F. Seymour Haden on "The Etching Revival." I. 3 p.m.

Society of Antiquaries.—8.30 p.m.

Dundee Institute of Architecture, Science, and Art.—Social Gathering in the Victoria Art Galleries, Dundee. 6.45 p.m.

FRIDAY, APRIL 6.

Institution of Civil Engineers (Students' Meeting).—Mr. W. H. Hamer on "The River Humber," 8 p.m.

SATURDAY, APRIL 7.

Edinburgh Architectural Association.—Visit to the University Hall Buildings, Mound.

Queen's College, Cork.—Mr. Arthur Hill on "The History of Architecture." XII. 3 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

2,497.—FIREPLACES: *J. Dean.*—With the view of obtaining automatic consumption of air, smoke, and gases in fireplaces, the bottom layer of the fire is, according to this invention, supplied with air necessary for combustion from an open ash-pit through a bottom grating, the level of the flue being just above it. This bottom layer being always brightly burning, all smoke and gas is drawn down through it. Where necessary, special flues are made.

5,680.—FLUSH-OUT CISTERN: *C. Darrah.*—In this apparatus a tube or barrel is fitted with a piston, and communicates with the down-pipe of the cistern by a branch-pipe opening into the tube or barrel at a point near its top end. The piston being light, the rush of water serves to keep it up above the opening of the branch-pipe till the cistern is drained and the syphonic action ended by the bottom end of the tube being uncovered with water.

6,328.—MOSAICS: *H. B. Allaeys* (Montana, U.S.A.).—A plate of glass is placed on the top of the painting or picture to be represented in mosaic, and a transparent coloured sketch or copy of the picture is made on the upper surface of the glass. The plate is then held in such a position that the copy is plainly visible through the glass. The smooth surface of the blocks of stone or other substance of which the mosaic is to be composed are then cemented to the under surface of the glass. When this has been entirely covered, the under rough surface of the blocks comprising the mosaic are covered with cement, thus forming a solid, firm mosaic. When the cement has hardened sufficiently, the glass plate is removed, and the smooth or upper surface of the mosaic is polished and cleaned.

7,042.—BRICK-MOULDING MACHINES: *J. W. Craven.*—To ensure that the mould-table is driven slowly in carrying the filled moulds from under the pug-mill, and then quicker for the rest of the movement, the gear is made elliptical, and acts automatically to bring about this result.

7,047.—PARQUETRY: *J. Freyberg.*—Small slabs of wood are placed on the cross-grain, glued together, and then sawn and cut very thin, and the sections cemented on to scrim or canvas.

10,619.—PAINT: *W. Ward and another.*—For painting the inside of petroleum tanks, a special indiarubber cement or paint is used, the formula for making which is given in the specification.

24,246.—FLOORS: *J. Collingwood.*—Two thicknesses of boards are used, the same being screwed together, and having between them galvanised wire netting, the whole forming the improved system of construction.

24,673.—PREVENTING SMOKE, &c.: *W. Benning and another.*—A false back of fire-clay or metal is arranged toward the back of the fireplace, and the lower edge is arranged to receive a sliding damper to regulate the air-supply.

6,589.—VENTILATORS: *D. Donald and another.*—According to this invention the main body of the ventilator consists of a series of vertical louvres protected by an outer arrangement of baffle-plates. The wind striking against these baffle-plates and over the louvres exhausts the foul air through the central shaft of the ventilator. The cap is of a conical shape, and is made so that a sloping horizontal passage is left between the cap and the top of the louvres, which forms an additional exhaust.

7,382.—VENTILATORS: *J. Shaw.*—This ventilator also depends on the novel form of the baffle-plates, and the use of a grid or filter in conjunction with the ventilator.

7,473.—VENTILATING: *J. Shaw.*—This patent is an amplification of the principles carried out in the foregoing invention, especially with reference to the escape or removal of foul or heated air from rooms or buildings.

7,504.—FIREPROOF FLOORS: *R. Astley.*—A number of iron joists are, according to this invention, placed about 2 ft. apart, and between them are fixed special fireclay lintels. These lintels are constructed with a bottom flange grooved to receive the ceiling plaster, and a vertical central web with a roll on the top with a hole through. An iron rod is placed through this hole to prevent lintels from falling should they become broken. Curved corrugated iron resting on the joists is placed between the lintels to carry concrete to form the floor.

7,530.—STAIR TREADS: *W. H. Bagley.*—The frame is made of brass with corrugations or depressions in it. These depressions are filled up with lead or softer metal.

16,415.—FIREPROOF CEILINGS: *W. A. Burr.*—Hollow tiles with suitable keys on their edges to retain the plaster are laid over the wooden floor joists.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Sewerage and Drainage Scheme	South Stoneham R.S.A.	.....	May 7
*New Baths and Washhouses	St. Marylebone Public Baths and Washhouses Comrs.	.....	
*Workhouse Infirmary	King's Norton Union	100*l.* 60*l.* 40*l.*	June 4
		.....	No date

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered
*Granite Pitching	Bermondsey Vestry	*Official*	April 2
*Roadworks	Borough of Croydon	do.	April 3
Stores, Buildings, &c. Southampton Docks	L. & S. W. Ry. Co.	do.	do.
Pipe Sewers, &c. South Forest-road	Aberdeen Town Coun.	Wm. Dyack	do.
Shop and Three Houses, Elizabeth-street	Nelson Co-op. Society, Lim.	Smith Whitehead	do.
Kerbing, &c. (three contracts), near Bristol	Kingswood Local Bd.	D. H. W. Powell	do.
Three Shops, House, and Warehouse, Otley, Yorks	.....	Fairbank & Wall	do.
Sewerage Extension Works, Knock Valley	Belfast Union	Young & Mackenzie	do.
Paving, Flagging, &c. Reginald-road	Maidstone U.S.A.	W. G. Scoones	do.
*Wood Paving Works	St. Mary Abbotts Vestry, Kensington	W. Weaver	do.
Cottage, Parkgate, Frizington, Cumberland	Cleator Moor Co-op. Soc. Lim.	.....	do.
*Roadworks	Southend-on-Sea Corp.	C. T. Copley	April 4
Four Houses, Norwood Green, Hipperholme, Halifax	.....	J. T. Walsh	do.
Platform Pavements, &c. Dundalk	G. N. R. Co. (Ireland)	*Official*	do.
*Shelter House	Islington Vestry	do.	April 5
Flint Road Metal (2,220 yards)	Horsham Local Board	do.	do.
Metalling Road, Llantrisant and Llantwit Fardre	Pontypridd High. Bd.	J. Griffiths	do.
School Buildings	Uldale (Cumb.) Grammar School Governors	A. W. Johnston	do.
*Infectious Diseases Hospital	Boro of Burton-upon-Trent	J. E. Swindlehurst	do.
Steam Laundry, Stables, &c. Pasture-lane, Clayton, Yorks	.....	Abm. Sharp	do.
Presbytery, Yeathouse-road, Frizington, Cumberland	Rev. W. Hurley	F. J. Edge	do.
Lecture Room, &c. Wesleyan Chapel, Carr-road, Nelson, Lancs.	Rev. H. H. Vowles	Thos. Bell	do.
Church and Presbytery, New Wortley, Leeds	Rev. A. J. Hassing	Jno. Kelly	do.
Congregational Chapel, Soar, Carmarthenshire	D. Davies	Daniel Jones	do.
*Cleaning and Painting Works	Midland Railway	*Official*	April 6
*Cleaning and Painting Works (Northern Division)	do.	do.	do.
*House, Sea Mills, near Bristol	do.	do.	do.
Pair Semi-detached Houses, Albany-street, Rotherham	J. Platts	.....	do.
Additions, &c. to Bell's Folly, near Durham	.....	H. T. Gradon	April 7
Residence, Rawmarsh, Yorks	Wm. Willey	J. Platts	do.
Residence, Clayport-street, Alnwick	J. R. Stephenson	G. Reavell, Jun.	do.
Church Restoration, Hameringham, near Horncastle	.....	C. H. Fowler	do.
Street Works	Swindon New Town Local Board	H. J. Hamp	April 9
*Tarpaving Footpaths, &c.	Bournemouth T. C.	F. W. Lacey	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered
*Repairs, &c. to Asylum, Cleveland-street	Central London Sick Asylum District	*Official*	April 9
Surveyor's Materials	Leigh (Lancs.) Local Board	do.	do.
School Buildings, Llanwnda, Wales	Bettws Garmon and Llanwnda U. D. Sch. Board	do.	do.
Passenger Station, Shed, &c. Usk, Mons.	G.W.Ry. Co.	do.	do.
Lowering a Hill and Widening Road, Batchelor's Bump, Lewes	East Sussex C.C.	H. Card	do.
Laying out Sewage Farms, &c.	Handsworth Loc. Bd.	W. H. Lancashire	do.
Surveyor's Materials, near Canterbury	Blean Highway Auth.	H. T. Sidwell	do.
*Granite Pitchers	Tottenham Local Bd.	P. E. Murphy	do.
*Main Drainage Works	Moss Side Local Board	John Bowden	do
*Granite Setts	Birmingham Public Works Committee	W. S. Till	do.
*Lead Work, &c. St. Mary's Church, Bury St. Edmunds	The Committee	John Codd	do.
*Making-up and Paving Road	Fulham Vestry	J. P. Norrington	April 11
*Making-up Roads	Lewisham Bd. of Wks.	*Official*	do.
*Construction of Main Sewer, &c.	St. Helen's Corp.	G. J. C. Broom	do.
*Broken Granite	Grays Thurrocks Local Board	A. C. James	April 12
*Four Shops, Kingston-on-Thames	.....	F. & W. Stocker	do.
Additions to Grammar School, Mansfield, Notts.	Governors	.....	do.
*New Main Sewers, &c.	Bournemouth T. C.	F. W. Lacey	April 13
Four Terrace Houses, Pudsey, Yorks.	.....	Herbert Hodgson	April 14
Granite, Macadam, &c.	Nelson (Lancs.) Corp.	J. W. Bradley	April 16
School Buildings, Eastville, Bristol	Stapleton Sch. Bd.	E. W. Barnes	April 18
*Erection of Customs House	Ramsgate Corporation	W. A. Valon	April 19
*Re-building Cockleburn Bridge, Upminster	do.	do.	do.
*Roads and Sewers, Stratford	Essex County Council	*Official*	do.
*Construction of Aqueduct, &c.	West Ham School Bd.	Newman & Jacques	April 24
*Removal of House Refuse	Birmingham Corp.	Jas. Mansergh	April 25
Villa Residence, near Warrington	New Windsor T. C.	*Official*	May 1
Additions to Schools, South Benfleet, Essex	W. H. Rigbey	.....	No date
Twelve Cottages, Caerphilly, Wales	.....	C. Nicholson	do.
*Shops, Bakehouse, and Stabling, Walthamstow	Caerphilly Building Club	J. H. Phillips	do.
*Superstructure of New Premises, Nottingham	Proprietors, Everett's Stores	J. W. Dunford	do.
*Repairs, &c. and Painting Works	Prudential Assur. Co.	A. Waterhouse & Son	do.
*Glazing Conservatory	Queen's Hotel Co. (Hastings), Lim.	A. Wells	do.
Six Houses, Walkergate, Otley, Yorks.	W. Goodman	.....	do.
Wesleyan Chapel, Woodside, Horsforth, Leeds	.....	Fairbank & Wall	do.
Extension of Forgeman's Arms, Burnley	.....	do.	do.
Two Houses, Brunshaw-road, Burnley	.....	Chas. Parsons	do.
	.....	Hitchon, Son, & Lancaster	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Prime Cost Clerk	St. George-the-Martyr, Southwark Vestry	2*l.* 10s.	April 3
*City Surveyor	City of Manchester	1,000*l.*	April 11

Those marked with an Asterisk (*) are advertised in this number. *Competitions, p.* iv. *Contracts, pp.* iv., vi., viii. *and* ix. *Public Appointments, pp.* xx. *and* xxii.

21,925.—FLUSH-BOLT: *L. Meyhoefer* (Berlin). The bolt, which forms the subject of this invention, is actuated by a lever with a powerful action, arranged in such a way that the lever lies, when in its extreme positions, in corresponding slots in the face-plate or framing of the bolt.

[798].—ROOFING TILE: *C. Ernenputsch.*—To prevent snow or rain entering or passing through the roof at the place of junction with the tiles, cavities or cuts fitted to receive plugs are placed at the junction-angles. When plugged, the whole roof is snow and rain proof.

NEW APPLICATIONS FOR LETTERS PATENT.

MARCH 5.—4,612, H. Willings and E. Eaton, Device for Supporting a Window-sash and Preventing same from being opened.—4,615, W. Flavill, Preventing the Freezing and Bursting of Water-pipes. — 4,623, T. Lishman, Chimneys and Ventilating Shafts.

MARCH 6.—4,643, E. Cotton, Ventilation of Water-closet Pans whilst in use.—4,653, H. Benwell and E. Kent, Oval Painting Brushes.—4,654, F. Harrop and W. Boyles, Novel Draught Excluder.—4,655, S. Collyer, Coloured Mosaics.—4,670, S. Holgate and L. Whittaker, Kilns for Drying and Burning Bricks, Tiles, &c.—4,688, E. Goddard, Wall Gas-bracket.—4,693, E. Lording, Sash-fastener.—4,707, A. Bagnold, Removal of Floor Boards and other articles or things which are secured by Screwing, Nailing, Bolting, &c., to the Refastening of same, and to Tools or Apparatus therefor.—4,708, J. Chadwick, Chimneys, &c.—4,740, E. Keen and J. Goddard, Portable Flooring.—4,746, B. L. Jungström, Ratchet Braces.

MARCH 7. — 4,766, C. Francis, Reversible Safety Window.—4,772, J. McAllister, Locks for Doors.—4,786, E. C. Berger and J. Thijwissen, Roofing Tile applicable to Roof Gutters.—4,815, G. Lavington and E. Wright, Chimney-pots and Ventilating Caps.—4,817, A. Foster, Chisel.—4,818, M. Hirshchfeldt, Spring Butt Hinge.

MARCH 8.—4,847, J. Maggs, Metal Screws for Woodwork.—4,888, A. Wing, Socketted Drain-pipes.

MARCH 9.—4,936, J. Edmundson, Water-closets.—4,950, M. Adams, Automatic Flushing Apparatus.—4,964, H. Woollett, Chimney-pots.—4,968, T. Shurmer, Sliding Windows.—4,976, J. Moy and H. Harris, Mechanical Saw-setter. — 4,991, T. Ford, Combined Fastener and Draught Excluder for Window-sashes.

MARCH 10.—5,020, E. Koch, Plaster.—5,051, T. Woodard, Portable Alarm Fastenings for Doors, &c.—5,070, J. McNair, Detachable or Removable Joint for facilitating access to the interior of drain water-pipes.

MARCH 12.—5,099, W. Whitley, Sliding Windows or Sashes.—5,101, G. Billington, Ornamental Plaques, &c.—5,123, K. Stierle, Binding for Paint Brushes.—5,135, W. Wilding, Carpenters' Gauges, &c.—5,137, E. Benard, Cements.—5,160, C. Potter, Paving.

MARCH 13.—5,208, J. Munday, Flushing Cisterns.—5,248, J. Matthews, Door Springs.

MARCH 14.—5,344, G. Bischof, Whitelead Cans.—5,347, J. Mays, Whitelead.—5,352, T. Carter, Flushing Cisterns or Tanks.—5,366, A. Harrison, Cowls of Chimneys and Ventilating Shafts.—5,370, G. Duqueny, Levels.

MARCH 15.—5,395, A. Walker, Staircase and other Steps, and in Pavements, Floors, and Landings.—5,435, W. Marshall and G. Strong, Plumb Rule and Level combined.—5,441, J. Phillips, Chimney and Ventilating Cowl.—5,466, W. Beck, Promoting Draughts in Chimney Stacks.

MARCH 16.—5,480, J. Adams, Door Springs.—5,513, J. Duckett & Son, Limited, and S. Middleton, Flushing Cisterns.—5,514, T. Thompson, Window-sashes, Doors, &c.—5,535, F. Spicer, Window-sash Fastener.

MARCH 17.—5,574, C. Cooper, Cleansing Sewers, &c.—5,603, W. Hay and J. MacArthur, Duplicate Circular Sawing Machines.—5,608, J. Noble, Paint.—5,626, T. Banks, Fireproof Floors.

PROVISIONAL SPECIFICATIONS ACCEPTED.

791, J. Wilson, Door-bolt and Electric Switch.—1,016 G. Kirk, Rain-water Channels.—1,203, W. Taylor, Door-stop.—2,881, A. G. Watkin, Colouring or Ornamenting Wall-paper, &c.—2,952, J. Fingland, Preventing Blow-downs in Chimneys.—3,218, F. Trier, Stone Saws and Frames.—3,241, T. Twyford, Water-closets or Water-closet Basins.—3,242, T. Twyford, Flushing Cisterns.—3,434, A. Brown & H. Pruce, Connecting Door and like Knobs to their Spindles.—3,544, R. Baxendale, Chimney-pots, &c.—3,708, J. Mair, Window Sashes.—3,763, J. Featherstone, Construction of Sash Window Frames. —3,823, M. Brooks, Window Sashes.—4,090, J. Franz, Spring or Weight-actuated Blowers or Ventilators.—4,131, A. Davey, Set-squares and T-squares.—1,157, H. Lake, Artificial Marble.—3,276, J. Kilpatrick, Drainage Traps.—3,449, W. Johnson, Sash Pulleys.—3,689, J. Aitken, Latches for Window Sashes.—4,166, J. Parker, Preventing the Bursting of Water Pipes.—4,360, J. Greenall, of the firm of T. Dunks & Co., Supports for Pipes.—4,377, R. Astley, Construction of Fireproof Floors.—4,623, T. Lishman, Chimneys and Ventilating Shafts.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

8,853, W. Needham, Wood Screws.—475, G. Stein, Hydraulic Cement.—1,590, C. Martens, Cowls.—8,944, F. Thomas, Drain and Other Pipes.—9,381, W. Crookes, Glazing of Bricks.—10,065, A. Shore, Bench Holder for Woodcarvers and Joiners. — 13,514, G. Croker, Gully Traps.—13,703, T. Ryland and E. Bird, Machines for Carving Wood, &c.—431, E. Reisser, Rotary Flush Water Receptacle for Water-closets, &c.—2,414, S. Dutton, Water-closets.—2,466, G. Thomson and G. Morrell, Water-closets.—3,233, H. Brown and G. Mitchell, Ventilators.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

MARCH 13.—By *Driver & Co.* (at Beckenham): A plot of f. land, Wickham-rd., Beckenham, 420*l.*

MARCH 19.—By *W. Bradly* (at Deptford): 5, Earlswood-st., Greenwich, f., 365*l.*—By *S. P. Read & Co.*: 111, Princess-st., Edgware-rd., u.t. 28 yrs., no g.r., 375*l.*—By *Messrs. Aldridges:* 26, Station-rd., Norwood, f., r. 62*l.*, 900*l.*; i.g.r. of 84*l.*, Martindale-rd., West Ham, u.t. 14 yrs., g.r. 32*l.*, with reversion to rack rental, 350*l.*—By *Herring, Son, & Daw:* I.g.r. of 200*l.* 12s., Atkins-rd., and New Park-rd., Clapham, u.t. 30 yrs., g.r. 65*l.*, 720*l.*; 47, Tressillian-rd., St. John's, S.E., u.t. 78 yrs., g.r. 7*l.* 13s., 500*l.*—By *C. W. Davies:* 109, Tufnell Pk.-rd., Holloway, u.t. 70 yrs., g.r. 8*l.*, 500*l.*; 107, Cottenham-rd., f., r. 45*l.*, 420*l.*—By *Millar, Son, & Co.*: A plot of f. land, Stafford-rd., Kilburn, 180*l.*; f.g.r. of 19*l.* 10s., Chaucer-rd., Brixton, reversion in 76 yrs., 495*l.*—By *Elliott, Son, & Boyton:* 154, Belsize-rd., Hampstead, u.t. 60 yrs., g.r. 9*l.* 5s., r. 55*l.*, 420*l.*—By *Henry & Latchford:* The residence "Maxton," Loats-rd., Clapham, u.t. 45 yrs., g.r. 20*l.*, r. 100*l.*, 810*l.*; 3, 4, 5, Acre-sq., f., 475*l.*; f.g.r. of 10*l.*, Park-rd., Stockwell, reversion in 33 yrs., 310*l.*; 12, Marmion-rd., Lavender Hill, u.t. 76 yrs., g.r. 7*l.* 10s., r. 40*l.*, 365*l.*

MARCH 20.—By *G. F. Box & Co.*: 73 to 79 (odd), Appleby-st., Kingsland, u.t. 11 yrs., g.r. 8*l.*, r. 123*l.*, 300*l.*—By *Hunter & Hunter:* I.g.r. of 33*l.*, Barnsdale-rd., Paddington, u.t. 69 yrs., 68*l.*; i.g.r. of 66*l.* 15s., Jews Walk, &c., Sydenham, u.t. 53 yrs., g.r. 5*l.* 5s., 1,470*l.*—By *W. W. Read & Co.*: 19, Heath-st., Barking, f., r. 36*l.*, 620*l.*—By *Debenham, Tewson, & Co.*: F.g.r. of 38*l.*, Worsley-rd., Hampstead, reversion in 83 yrs., 960*l.*; f.g.r. of 20*l.*, Bayonne-rd., Fulham, ditto in 86 yrs., 480*l.*; 23, 25, Casterton-st., Hackney, u.t. 84 yrs., g.r. 13*l.*, 150*l.*; two amphitheatre stalls, Royal Albert Hall, 78*l.*—By *E. Wood:* "The Grange," Barnes Green, c., 1,050*l.*; 54, Kingsbury-rd., Islington, u.t. 57 yrs., g.r. 4*l.*, r. 32*l.*, 290*l.*; 29, Culford-rd., Hackney, u.t. 35 yrs., g.r. 4*l.*, r. 34*l.*, 285*l.*; 70, Eglington-rd., Bow, f., 350*l.*; 76, Boyson-rd., Walworth, u.t. 57 yrs., g.r. 6*l.* 6s., r. 40*l.*, 280*l.*; 72, Bellenden-rd., Peckham, u.t. 82 yrs., g.r. 4*l.*, 10s., 225*l.*—By *J. & W. Johnson:* 5, 6, Felton-st., Hoxton, f., 465*l.*; 25, Holt-pl., f., 225*l.*; 60, Sydenham-st., Whitstable, Kent, f., 150*l.*; 20, Harvey-st., Hoxton, and 43, 45, 47, Felton-st., u.t. 22 yrs., g.r. 20*l.*, 370*l.*; 1 to 11, Halcombe-pl., u.t. 24 yrs., g.r. 40*l.*, 520*l.*; 116, 118, Phillip-st., u.t. 24 yrs., g.r. 12*l.*, 200*l.*; 281 to 287, 291, 303, 305, 307, Wick-rd., Victoria-pk., and 2, Cowdry-st., u.t. 62 yrs., g.r. 50*l.*, 1,175*l.*; 57, 59, 62, 64, 65, 66, Mortimer-rd., Kingsland, u.t. 21 yrs., g.r. 32*l.* 12s., 1,000*l.*

MARCH 21.—By *E. Holsworth:* 22, Woodland-rd., Stoke Newington, u.t. 70 yrs., g.r. 4*l.* 15s., r. 32*l.* 10s., 205*l.*; 60, 62, 64, Londesborough-rd., u.t. 70 yrs., g.r. 16*l.* 10s., r. 83*l.*, 630*l.*—By *E. Wood:* "Parkhurst" and "Marlow Villas," Underhill-rd., Honor Oak, u.t. 85 yrs., g.r. 11*l.*, r. 54*l.*, 410*l.*; 7, Park-cres., Stoke Newington, u.t. 54 yrs., g.r. 8*l.*, r. 50*l.*, 440*l.*; 60, The Grove, Hammersmith, u.t. 898 yrs., g.r. 10*l.*, r. 46*l.*, 310*l.*; 208, Cambridge-rd., Kilburn, u.t. 90 yrs., g.r. 8*l.* 8s., r. 50*l.*, 375*l.*; 175, 177, Park-rd., Peckham, u.t. 46 yrs., g.r. 4*l.* 16s., r. 36*l.*, 200*l.*; 14, Raymond-rd., West Ham, u.t. 68 yrs., g.r. 5*l.*, 165*l.*

MARCH 22.—By *C. & H. White:* 26, Deacon-st., Walworth, u.t. 48 yrs., g.r. 6*l.*, r. 42*l.*, 340*l.*: 8, Glasgow-ter., Pimlico, u.t. 30 yrs., g.r. 6*l.*, r. 48*l.*, 355*l.*—By *Wakefield & Son:* 112, Oakfield-rd., Penge, f., 430*l.*—By *C. Varley:* 4, 5, 6, Pear Tree-ct., Clapton, and 1 to 4, Pear Tree-pl., f., 660*l.*—By *C. C. & T. Moore:* 2, 4, 6, Dunlace-rd., Clapton, u.t. 72 yrs., g.r. 6*l.* 10s., r. 92*l.*, 800*l.*; 14, Aston-st., Limehouse, u.t. 32 yrs., g.r. 3*l.* 5s., r. 26*l.*, 230*l.*—By *W. J. Newell:* 50, 52, Watson-st., Deptford, f., 390*l.*; "Balaclava House," Balaclava-rd., Bermondsey, u.t. 41 yrs., g.r. 26*l.*, 200*l.*

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street.; rd. for road; sq. for square; pl. for place; ter. for terrace cres. for crescent; yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.

Greenheart, B.G.		
ton	9/0/0	0/0/0
Teak, E.I. ..load	9/10/0	16/0/0
Sequoia, U.S.ft.cu	2/3	2/6
Elm, Canada load	2/15/0	4/0/0
Ash, do,.....	2/5/0	3 5 0
Oak, do.	3/10/0	4/15/0
Teak, Dantsic, &c.	1/5/0	2/10/0
Oak, do.	2/10/0	4/15/0
Pine, Canada	5/10/0	7/0/0
Do. Pine, Canada red	2/10/0	3 0/0
Do. Yellow	2/10/0	4/15/0
Do. Dantsic, fath.	4/10/0	5/10/0
Do. St. Petersburg..	5/0/0	6/10/0
Do. Wainscot, Riga, &c., log	2/5/0	4/10/0
Do. Odessa, crown....	2/5/0	4/10/0
Deals, Finland and & 1st std 100	8/0/0	10/10/0
Do. 4th & 3rd ..	7/10/0	8/0/0
Do. Riga 1st	22/10/0	29/10/0
Do. St. Petersburg, 1st yellow	10/0/0	13/10/0
Do. 2nd yellow	8/0/0	9/0/0
Do. white	8/10/0	11/0/0
Swedish.....	8/10/0	16/10/0
White Sea.....	8/0/0	16/10/0
Canada, Pine 1st	22/10/0	29/10/0
Do. do. 2nd....	17/0/0	18/10/0
Do. do. 3rd, &c.	7/10/0	10/5/0
Do. Spruce, 1st	9/0/0	11/0/0
Do. do. 3rd & 2nd	6/10/0	7/10/0
New Brunswick	6/0/0	7/5/0
Battens all kinds	3/0/0	15/0/0
Flooring boards, sq., 1 in. prep. 1st	0/10/0	0/15/0
Do. 2nd.....	0/7/6	0/12/6
Other qualities—	0/5/0	0/7 0
Cedar, Cuba ..ft.	3½	4½
Honduras, &c.	3½	4½
Mahogany, Cuba	3½	5½
St. Domingo, cargo av.	/3	1/6
Mexican do. do.	/3	/4
Tobasco do. do.	3½	/6
Honduras do. ..	3½	5½
Box, Turkey ton	4/0/0	13/0/0
Lime, Rio.....	8/0/0	18/0/0
Rosewood, Bahia	7/0/0	17/0/0
Satin, St. Domingo.....	0/0/5	0/1/2

TIMBER (*continued*).

Satin, Porto Rico	0/0/6	0/1/6
Walnut, Italian ..	0/0/3½	0/0/7

METALS.

Iron—Pig, in Scotland .....ton	2/3/0½	0/0/0
Bar, Welsh, in London	5/17/6	6/0/0
Do. do. at works in Wales.....	5/7/6	5/10/0
Do. Staffordshire, in London	6/0/0	6/10/0
COPPER—British cake and ingot	43/0/0	43/10/0
Best selected ..	44/0/0	44/10/0
Sheets, strong ..	52/0/0	0/0/0
Chili bars	41/2/6	41/7/6
YELLOW METAL lb	0/0/4½	0/0/5
LEAD—Pig, Spanish.....ton	9/3/6	9/5/0
English com. brands.....	9/5/0	9/6/3
Sheet, English, 6 lbs. per sq. ft. and upwards....	11/0/0	0/0/0
Pipe.....	11/10/0	0/0/0
ZINC—English sheet.....ton	18/10/0	19/0/0
Vieille Montagne	20/0/0	0/0/0
TIN—Straits.....	69/7/6	69/17/6
Australian.....	70/0/0	70/10/0
English Ingots..	73/0/0	73/10/0
Banca	73/0/0	74/0/0
Billiton	69/0/0	69/10/0

OILS.

Linseed ..... ton	19/17/6	20/0/0
Cocoanut, Cochin	29/0/0	0/0/0
Do. Ceylon	23/10/0	23/15/0
Palm, Lagos.....	24/0/0	0/0/0
Rapeseed, English pale	21/10/0	22/0/0
Do. brown.....	20/0/0	0/0/0
Cottonseed ref....	19/15/0	21/10/0
Oleine	22/0/0	24/0/0
Lubricating, U.S.	4/0/0	5/0/0
Do. refined	5/0/0	12/0/0
TAR—Stockholm barrel	0/23/0	0/0/0
Archangel.....	0/11/0	0/0/0

TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.*]

ABERDEEN.—Accepted for the erection of Free Church and manse, Peterculter. Mr. Jno. Rust, City Architect, 224, Union-street, Aberdeen. Quantities by architect:—

Mason.—Roe Smith.....	£1,645 0 0
Carpenters.—Jas. Gaine & Sons....	1,146 15 0
Plumber.—John F. Anderson.....	149 2 0
Plasterer.—Alexr. Ross.....	136 0 0
Slaters.—Alexr. Adam & Co.....	131 5 0
Painters and Glaziers.—J. & S. Fybes.... ...	129 5 0
Heating Engineers.—Jas. Florence & Son	61 15 0
[All of Aberdeen.]	£3,419 2 0

ABERDEEN.—Accepted for alterations on and additions to Sailors' Home. Mr. James Souttar, architect, 42, Union-street, Aberdeen:—

Masons.—A. Milne & Son	£1,157 0 0
Carpenters.—Watson & Robb	624 0 0
Plumbers.—J. Blaikie & Sons	174 0 0
Slaters.—A. Adam & Co.....	25 0 0
Plasterers.—J. Stephen & Son	174 7 0
Painter and Glazier.—Gordon & Watt.....	108 0 0
Ironwork.—W. McKinnon & Co.....	47 7 0
Ironmongery, &c.—J. Laing & Co.....	29 18 6
Heating.—J. Blaikie & Sons	26 0 0
Total.....	£2,365 12 6
All of Aberdeen.]	

ABERDEEN.—Accepted for the erection of two dwelling-houses at Desswood-place. Mr. James Souttar, architect, 42, Union-street, Aberdeen:—

Mason.—Edgar Gauld	£586 0 0
Carpenter.—A. Winchester.....	306 0 0
Plumber.—John Petrie	76 0 0
Plasterers.—Mason & Sellar	73 4 0
Painter and Glazier.—G. Donald & Sons	48 19 0
Slater.—C. Maitland	40 0 0
Finishings, &c.	163 0 0
[All of Aberdeen.]	£1,293 3 0

ABINGDON.—For the supply of 2,400 tons Hartshill or other hard road-metal, for the Highway Board. Mr. C. Tame, District Surveyor, Appleford, near Abingdon:—

C. Abell, Atherstone	Hartshill at prices varying from 9s. to 10s. 4d.
Exors. of W. B. Beauchamp, Shepton Mallet	Cranmore stone at 8s. 6d. to 8s. 8d.
W. Gall, Marcham	480 yards each of local stone at 1s. 6d.
W. Bradfield	
J. Clempson, Wootton	Local gravel at 4s. and 5s. yer yard.

AYLESBURY.—For the erection of school buildings and offices, for the Stoke Mandeville School Board. Mr. W. F. Taylor, architect, Temple-street, Aylesbury:—

Mayne & Son.....	£1,058	Holland & Steel	£945
Grist	996 18	C. Crook.....	907 5
Webster & Cannon	972 0	G. H. Gibson High Wycombe (accepted)..	898 0
W. Folley.....	963 0		
Abbott & Son	947 0		

BRIGHTON.—For erecting two houses in "The Drive," Hove, for Mr. T. Williams. Mr. G. Warren Cooper, architect, Bedford Row House, Bedford Row:—

F. & E. Cooper	£6,200 0 0

BROADHEATH (Near Manchester). — For the erection of engineering works, stables and stores (exclusive of flooring and ironwork), for Messrs. Luke & Spencer, Limited, Manchester. Mr. G. Tinniswood, architect, 5, Osborne-road, Stockport. Quantities by the architect:—

Broadhurst & Co.	£4,750	Brown & Son	£4,242
Hampton	4,532	Southern & Son.....	4,240
Macfarlane	4,509	Hamilton	4,167
Lawton	4,369	Storrs, Sons, & Co.	4,148
Neill & Sons.....	4,293	Wm. Thorpe, Manchester (accepted).....	4,095
Megarity & Co.	4,284		
Green	4,275		

BROMLEY (Kent).—For works of drainage and laying out, and the erection of boundary-wall and fencing, at new cemetery, for the St. Luke's Burial Board. Messrs. Hugh S. Cregeen & Son, Surveyors:—

Jones, Richards & Co...	£604 0	E. Peill & Sons*	£457 0
F. & M. Lansbury	499 10	* Accepted.	

CHATHAM.—For the erection of Technical Education Institute, High-street. Mr. G. E. Bond, architect, Victoria Buildings Rochester. Quantities by the architect:—

G. J. Slade	£3,944	L. Seager.....	£3,449
T. Callund & Son	3,530	West Bros..... ..	3,368
J. G. Naylar & Son	3,486	E. W. Filley, Chatham* ..	3,145
		* Accepted	

CHERTSEY.—For the erection of infirmary, &c., and alterations to workhouse, tramp wards, &c., at Ottershaw, Chertsey, Surrey, for the Guardians of the Chertsey Union. Mr. C. Welch, architect, London-street, Chertsey. Quantities by the architect:—

The Weybridge Furnishing Company ..	£11,421 18	H. G. Nesmyth.....	£9,199 0
T. Knight & Sons	9,636 0	J. Martin	8,957 0
B. Ingram & Co.	9,240 0	R. J. Hunt, Chertsey*	8,697 0
[Architect's estimate, £8,892 10s. 2d.]		* Accepted.	

CROYDON.—For the erection of additions to the brewery, High-street. Mr. F. West, architect, Croydon:—

M. Taylor	£3,400	Smith & Sons	£3,094
S. Page	3 248	Bryan & Son	2,971
A. Bullock	3,194	Bulled & Co.	2,793

ELLAND (Yorks.).—For the erection of thirteen scullery-houses, for Mr. Albert Bailey, Westgate, Elland. Mr. J. E. Crowther, architect:—

Mason.—G. Redyhough, Elland	£1,175 0 0
Joiner.—J. E. Crowther, Elland	416 0 0
Plumber.—E. Elkington, Elland	50 0 0
Slater and Plasterer.—T. Wadsworth	244 10 0
Painter.—T. Townsden	25 0 0

FENTON (Staffs.).—For heating the Heron Cross Schools, Fenton, for the School Board of Stoke-on-Trent:—

Low Pressure.			
Haden & Son £732	0	R. P. de Ridder £350	0
Oldroyd 445	10	E. Peake..... 335	0
Jackson & Son..... 377	0	Messenger & Co..... 314	10
High Pressure.			
G. N. Haden & Sons £473	0	Bacon & Co., London, 8,536 ft. (accepted) £259	0
R. P. de Ridder 378	0	Trusswell & Son 181	10
Oldroyd 354	0	William Boulton 160	0
E. Peake..... 268	0		
Jackson & Son..... 259	18		

GODALMING.—For the construction of contributory drainage, north of the river Wey (Contract No. 1), for the Urban Sanitary Authority. Mr. Henry Moon, surveyor, High-street, Godalming:—

Wilkinson Bros.....£14,000		G. Osenton £11,372	
John Neave	12,870	James Dickson	11,330
William Cunliffe	11,493	Thomas Adams	11,300
B. Cooke & Co.	11,450	John Jackson, Plaistow*..	10,900
* Accepted for No. 1 Contract.			

GREAT HARWOOD (Lancs.).—For flagging and paving certain streets for the Local Board. Mr. R. Chippendale, Surveyor, Great Harwood:—

	Per yard. s. d.
Flagging.—John Hogarth, Accrington.....	0 10½
Paving.—Abraham Broadley, Clayton-le-Moors	0 5

HANLEY.—For lighting the Higher Grade Schools, Hanley, by electricity, for the Hanley School Board. Mr. Edward E. Scrivener, Architect to the Board:—

Ball & Co.....£661	7 3	Mansell, Mercier, & Co. £475	10 0
Brush Electric Co.... 588	19 9	J. Blackburn 466	14 8
Laing, Wharton, & Co. 585	8 9	Spagnoletti & Crookes 436	17 0
Fowler Lancaster, & Co. 557	13 0	Verity & Sons, Manchester (accepted).. 398	11 6

HANLEY (Staffs.).—For the erection of two shops, Piccadilly, for Mr. W. J. Moxon. Mr. Elijah Jones, architect, 10, Albion-street, Hanley. Quantities by the architect:—

G. A. Foster £1,480	0	C. Cornes £1,299	10
Geo. Ellis 1,477	0	A. & H. Salt, Bros..... 1,299	0
A. Ward 1,332	0	C. Smith 1,290	0
J. J. Longden 1,329	0	T. Godwin, Hanley* .. 1,285	0
* Accepted.			

HANLEY (Staffs.).—For the alteration of two shops, for Mr. Councillor Turner. Mr. Ambrose Wood, architect, Regent House, Hanley. Quantities by architect:—

C. Cornes £699	15	Ogden & Banks £643	0
G. Ellis..... 650	0	T. Godwin, Hanley* 639	0
* Accepted.			

HEATHFIELD (Sussex).—Accepted for new school, for the Heathfield School Board. Mr. H. Percy Monckton, architect and surveyor, 32, Walbrook, E.C.:—

F. R. Parris	£823 19 4

HEREFORD.—For additions and alterations to the "Old Friars," Hereford. Mr. W. W. Robinson, architect, 10, King-street, Hereford:—

Beavan & Hodges.....£1,372		Bowers & Co. * £1,156	
J. Davies 1,314		* Accepted.	
[All of Hereford.]			

IPSWICH.—For the erection of house, stables, &c., Woodbridge-road, Ipswich, for Mr. E. S. Singleton. Mr. Henry J. Wright, architect and surveyor. Quantities by the architect:—

W. Grayston... ....£1,695	8 1	E. Catchpole £1,609	0 0
J. Pells & Son..... 1,672	5 1	F. Bennett (accepted with modifications) 1,625	0 0
C. Barrett..... 1,660	0 0		

LAUNCESTON.—For the restoration of the tower of South Petherwin Church. Mr. G. H. Fellowes Prynne, architect, 6, Queen Anne's Gate, London, S.W.:—

	Granite.	Polyphant.
Ambrose Andrews	£220 0 0	£198 0 0
E. Sharland & H. Green.....	218 0 0	173 0 0
& W. Strike	224 0 0	167 0 0
W. H. Gooding, St. Thomas, Exeter* ...	200 0 0	150 10 0
* Conditionally accepted.		

LONDON.—Accepted for cleaning, distempering, &c., Settles-street Board School East, for the School Board for London:—

George Barker	£283 10 0

LONDON.—Accepted for alterations at the "White Hart," 89, High-street, Shoreditch, for Mr. Wm. Wright. Mr. Horace M. Wakley, architect, 11, Adam-street, Strand, W.C.:—

Hood, 471, Bethnal Green-road	£1,460 1 9

LONDON.—For the erection of a dwelling-house in Samuel-street, Woolwich, for the Trustees of the late Henry Shersby. Mr. Benaiah W. Adkin, architect, 14, Queen-street, Cheapside, E.C.:—

Wells & Sons £490		George Carter (accepted).. £375	
John Bull 465		J. W. Cuddington* 350	
A. J. Fenn 450		* Withdrawn.	

LONDON.—For the erection of the superstructure of Nos. 52 and 53, Parliament-street, Westminster. Mr. H. Huntly Gordon, architect. Quantities by Mr. E. S. Gale, Falcon-court, 32, Fleet-street, E.C.:—

G. H. & A. Bywaters £7,880		Hall, Bedall, & Co. £7,512	
Ashby & Horner 7,750		F. & H. F. Higgs 7,450	
J. Mowlem & Co. 7,639		Perry & Co. 7,397	
Trollope & Sons..... 7,600		Holloway Bros. 7,371	
Cubitt & Co. 7,526			

LONDON.—For taking down and rebuilding premises Nos. 47 and 48, Knightrider-street, and Nos. 1, 2, 3, and 4, Knightrider-court, for Messrs. Cook, Son, & Company. Mr. J. Douglass Mathews, architect:—

G. S. S. Williams & Son ...£4,430		J. Grover & Son £3,591	
Ashby & Horner 4,385		Killby & Gayford 3,540	
E. Lawrance & Sons 4,074		B. E. Nightingale 3,495	
Holloway Bros. 3,762		J. E. Walford & Son..... 3,302	

LONDON.—For alterations and repairs to premises, Brixton-road for Messrs. Peter & Evans. Mr. G. Warren Cooper, architect, Bedford Row House, Bedford Row:—

S. Haydon	£115 0 0

LONDON.—For the erection of warehouse, White-street and Tenter-street, for Messrs. Perrot & Perrott. Mr. W. Hilton Nash, architect. Quantities by Mr. R. F. Russell:—

Colls & Sons £14,720		Dove Bros.....£13,875	
Hall, Beddall, & Co. 14,084		J. Greenwood 13,458	
Higgs & Hill 14,540		Patman & Fothering-ham (accepted)..... 13,073	
J. Grover..... 14,184			
D. Charteris 13,983			

LONDON.—For reinstatement after fire at No. 24, Old Bailey, for Messrs. Boot & Carpenter. Mr. J. Douglass Mathews, architect:—

W. Larter & Son £2,170		J. W. Falkner £1,797	
William Downs 2,040		Killby & Gayford 1,793	
G. S. S. Williams & Son .. 1,922		E. Lawrance & Sons 1,711	
L. Whitehead 1,875			

LONDON.—For alterations and repairs, No. 28, Brunswick-square, W.C., for Dr. Murphy. Mr. A. Parnacott, surveyor, &c., 93, York-road, Lambeth, S.E.:—

Veitch & Close £497		Lapthorne & Co. £374	
Norris..... 443			

LONDON.—Accepted for repairs at No. 63, Kidbrooke Park-road, Blackheath. Mr. H. Percy Monckton, architect and surveyor, 32, Walbrook, E.C.:—

Walter B. Briant	£115 0 0

LOUGHBOROUGH.—Accepted for building "One Ash," Loughborough. Mr. Larner Sugden, architect, Leek. Quantities by the architect:—

William Moss & Son	£2,450 0 0

NEWBURY.—For alterations and additions to Frilsham House, near Newbury, Berks., for Sir Cameron Gull, Bart. Mr. S. Gambier Parry, architect:—

	Tender.		Est. A.		Est. B.
Colls & Sons £16,650		....	£15,850	....	£14,150
Wheeler Bros.	15,930	....	15,270	....	14,595
Stephens, Bastow, & Co., Limited	15,246	....	14,606	....	13,949
Escourt & Sons.....	14,543	....	14,068	....	13,1 29
Bottrill & Son, Reading (accepted)	13,448	....	13,080	....	12,575

If external joinery in deal in lieu of oak.
B. If internal joinery in deal in lieu of oak.

NEWBURY.—For the construction of sewage disposal works, Lower Way-lane, and Pumping Station, Newbury, for the Town Council. Mr. Jno. Anstie, engineer, 17, Victoria-street, London, S.W.:—

A. Kellett £5,458	12 0	E. C. James £4,362	0 0
R. R. Facey..... 5,108	19 7	B. Cooke & Co. 4,274	0 0
James Dickson 4,911	15 8	Geo. Elms, Benham, Newbury* 4,031	10 7
S. Elliott 4,902	17 0		
G. Bell 4,367	0 0	*Accepted.	

PENRITH.—For the construction of sewerage works, Lazonby, for the Union Rural Sanitary Authority. Mr. E. A. Sandford Fawcett, engineer, 1, Victoria-street, Westminster, S.W.:—

Joseph Jackson.....	£639 0 0
John Graham, Lazonby R.S.O., Cumberland*	510 8 9½
*Accepted.	

PENZANCE.—For the erection of dairy, shop, &c., 18 and 19, Redinnick-terrace. Mr. Richard Hill, architect, 1, Bay View Terrace, Penzance:—

Edward Pidwell (*Mason*)	£386 10
Joseph James (*Carpenter*)	
F. Julloa	372 0
Thomas James.....	364 10
A. Chapman	351 10
[All of Penzance.]	

PETERBOROUGH.—For the erection of house, stables, etc., Bamber-street, for Mr. Ray. Mr. J. G. Stallebrass, architect, Peterborough. Quantities by the architect:—

W. Jellings.....	£454 15 0	D. Gray	£417 0 0
J. T. Machin	448 0 0	W. Sibley	415 15 0
J. Nichels	439 16 3	T. Bailey*	403 0 0
J. Guttridge	435 0 0	*Accepted.	
W. Binder & W. Pape	420 0 0		
[All of Peterborough.]			

RADCLIFFE.—Accepted for the construction of settling tanks, and erection of buildings, &c., Mount Sion-road; sewage, &c., for the Local Board. Mr. W. L. Rothwell, Surveyor, Local Board Office, Radcliffe. Quantities by Surveyor:—

Contract No. 1.	
Etheridge & Clark, Cheetham Hill, Manchester	£8,963 8 1
Contract No. 2.	
John Wolstenholme, Albert Works, Ratcliffe ..	867 14 2

RUGBY.—Accepted for the execution of 300 yards new street, with drains, &c., South-street to Cambridge-street, for the Rugby Freehold Land Society. Mr. T. J. Franklin, Surveyor to the Land Society, Rugby:—

W. T. Hall, Rugby.....	£906 0 0

ST. BLAZEY (Cornwall).—For the construction of a reservoir; laying iron pipes, &c., for the St. Austell Rural Sanitary Authority. Mr. T. H. Andrew, Engineer, Dean-place, Liskeard:—

Edgar Duke.....£1,187	6 5	W. Tyzzer £699	10 3
James Julian.....	710 0 0	John Menear & N.	
W. Rowe	707 19 0	Oliver, St. Blazey*..	556 6 0
* Accepted.			

SALFORD.—Accepted for the erection of offices, Chapel-street, for the School Board. Messrs. Woodhouse & Willoughby, architects, 100, King-street, Manchester:—

Excavating, Draining, and Brickwork.—C. H. Normanton, Manchester	£2,549 0 0
Terra-cotta Setting.—C. H. Normanton, Manchester	393 0 0
Masonry—Thomas Derbyshire, Stockport	515 0 0
Carpentry and Joinery.—Halstead Bros., Eastwood and Todmorden	2,074 0 0
Slating.—James Barrow, Manchester.....	171 15 0
Ironfounder.—Myles Cooper, Manchester ...	327 0 0
Plumbing, Glazing, &c.—G. H. Openshaw, Pendleton, Manchester	467 10 0
Plastering and Painting.—Sir J. J. Harwood, Manchester	715 0 0
Terra-cotta.—Doulton & Co., London	1,544 10 0
Granite.—Fenning & Co., London	420 0 0
Internal Oak Woodwork.—S. J. Waring & Sons, Manchester.....	1,357 0 0
Heating and Ventilation.—Langfield & Co., Manchester	300 0 0

SANDOWN.—For extension to pier and new landing-stage, Sandown, I.W., for the Sandown Pier Extension Company, Limited, Mr. T. R. Saunders, Engineer, Ventnor:—

The Barrowfield Ironworks, Ltd. £9,450		H. J. Sanders £9,130	
B. Cooke & Co. 9,190		H. Young & Co..... 9,000	
		Roe & Grace 8,975	

SEVENOAKS (Kent).—Accepted for alterations and additions to "Copthall," and erection of stabling. Mr. H. Percy Monckton, architect and surveyor, 32, Walbrook, E.C.:—

S. Iggulden.....	£892 0 0

UPPER DOVERCOURT.—For the erection of infants' school for 185, covered playgrounds, walling, &c., at Upper Dovercourt, Essex, for the Harwich School Board. Mr. J. W. Start, architect, Cups Chambers, Colchester, and Main-road, Harwich. Quantities by the architect:—

Smith, Beaumont, & Dawson £1,863	6 7	W. E. French & Co. £1,489	0 0
F. Bennett..... 1,645	11 9	S. Parmenter 1,465	0 0
J. Moran & Son 1,575	0 0	A. Brown 1,450	0 0
Girling & Coe 1,548	0 0	E. Saunders, Dovercourt (accepted)..	1,277 0 0
E. S. Gunn 1,544	4 5	E. West.....	1,265 0 0
Kerridge & Shaw .. 1,408	6 0		

(*a*) Cost of school buildings, £792. Cost of covered playgrounds, privies, &c., £216. Cost of boundary walls, playgrounds, &c., £271. Cost per head of (*a*) £4 5s. 5d. Total cost per head £6 18s. 02-3d.

WAINFLEET (Lincs.).—For oak seating, pulpit screen, flooring, &c., the parish church. Mr. J. B. Corby, architect, Stamford :—

A. T. Blood	£1,087 12 6	S. Sherwin	£874 0 0
Walter & Hensman	1,039 0 0	Thompson & Sons	829 0 0
A. Wood	1,030 0 0	T. Crawshaw	706 12 4
W. H. Parker	1,005 16 0	I. J. Turner, Wainfleet (accepted)	673 13 11
Bowman & Sons	983 10 0		

WATFORD.—For the erection of a hospital for infectious diseases, for the Watford Union Rural Sanitary Authority. Mr. Chas. P. Ayres, architect, 14A, High-street, Watford. Quantities by Mr. J. W. Bailey, Kilburn :—

Holliday & Greenwood	£13,893	Wall & Co.	£12,100
William Bailey	13,464	Clifford & Gough	11,978
C. Eames	13,056	G. & J. Waterman	11,934
W. B. Neal	12,895	Kimberley	11,774
C. Brightman	12,796	H. Martin	11,550
Longley Bros.	12,773	Webster & Cannon	11,478
Brown & Sons	12,600	Andrews & Sons, Watford*	11,390
Dunham Bros.	12,592		
Turner, Ltd.	12,517	Wiggs	11,190
William Judge	12,448	Kerridge & Shaw	11,147
C. Miskin	12,387	F. Dupont	10,790

[Architect's estimate, £11,905 0 0.]

* Accepted subject to the approval of the Local Government Board.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (or 4s. 9d. per quarter), can ensure receiving "The Builder," by *Friday Morning's Post*.

TO CORRESPONDENTS.

J. W. B.; G. B. (amount should have been stated).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

'THE BUILDER" CATHEDRAL SERIES.

THE CATHEDRALS OF ENGLAND AND WALES.

(January, 1891, to June, 1893.)

In each case—EXTERIOR VIEW, specially drawn for this series, GROUND PLAN, to a large scale, shaded to indicate the date and style of the several parts; DESCRIPTIVE ARTICLE, with sketches of details, &c.

*1. Canterbury	9. Norwich	17. Llandaff	24. Truro
*2. Lichfield	10. Rochester	18. Oxford	25. St. David's
*3. St. Alban's	*11. Lincoln	19. Southwell	*26. York
*4. Peterboro'	12. Gloucester	20. Worcester	27. Ripon
*5. Wells	13. St. Paul's	21. Bangor and	28. Chester
*6. Exeter	14. Hereford	22. St. Asaph	29. Manchester
*7. Salisbury	15. Chichester	23. Winchester	30. Carlisle
8. Bristol	16. Ely		31. Durham

*Post-free FOURPENCE-HALFPENNY each, except 1, 2, 3, 4, 5, 6, 7, 11, and 26, the numbers of "THE BUILDER" containing these being *out of print*; but reprints of the VIEW, PLAN, AND DESCRIPTION OF CANTERBURY, LICHFIELD, ST. ALBAN'S, PETERBOROUGH, WELLS, EXETER, SALISBURY, LINCOLN, and YORK, can be had, price 1s. each. Postage and packing of reprints extra; single sets, 2d. or the nine sets together, 6d.

☞ [The whole series (including reprints) 10s.; post-free, 12s. 6d.]

THE ANCIENT CATHEDRALS OF SCOTLAND.

1893.

1. Glasgow	*July* 1	3. Aberdeen	*Sept.* 2	5. Iona	*Nov.* 4
2. Edinburgh	*Aug.* 5	4. Kirkwall	*Oct.* 7	6. Dunblane	*Dec.* 2

1894

7. Dunkeld	*Jan.* 6	8. St. Andrews	*Feb.* 3	10. Elgin	*Mar.* 3
		9. Brechin			

THE ANCIENT CATHEDRALS OF IRELAND.

1894.

1. Christchurch, Dublin *April* 7. | 2. St. Patrick's, Dublin *May* 3. Kilkenny .. .. *June* 2

THE ABBEYS OF GREAT BRITAIN.

1. Westminster .. .. *Jan.* 6, 1894.

(This Series will be resumed when the Irish Series is completed.)

Post-free FOURPENCE-HALFPENNY each.

THE REREDOS, ST. PAUL'S

(15 in. by 11½ in.), on stout paper, for framing, 6d.; by post, 8d.

PORTFOLIOS.

for Preserving the Plates unfolded, 2s. 6d.; by post, 3s.

London: Publisher of "THE BUILDER," *46, Catherine-st., W.C.*

PUBLISHER'S NOTICES.

Registered Telegraphic Address, 'THE BUILDER,' LONDON.

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

Terms for series of Trade advertisements, also for Special Advertisements on front page, Competitions, Contracts, Sales by Auction &c., may be obtained on application to the Publisher.

SITUATIONS WANTED.

FOUR Lines (about thirty words) or under. .... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

. Stamps *must not* be sent, but all small sums should be remitted by Cash in Registered Letter or by Postal Orders, payable to DOUGLAS FOURDRINIER, and addressed to the Publisher of "THE BUILDER," No. 46, Catherine-street, W.C.

Advertisements for the current week's issue are received up to THREE o'clock p.m. on THURSDAY, but "Classification" cannot be guaranteed for any which may reach the Office after HALF-PAST ONE p.m. on that day. Those intended for the front Page should be in by TWELVE noon on WEDNESDAY.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before 10 a.m. on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent Garden, W.C., *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES, { NINEPENCE EACH. By Post carefully packed) 1s.

TERMS OF SUBSCRIPTION.

'THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c. 26s. per annum. Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the Publisher of "THE BUILDER," No. 46, Catherine-street, W.C.

W. H. Lascelles & Co.

121, BUNHILL ROW, LONDON, E.C.

Telephone No. 270.

HIGH-CLASS JOINERY.

LASCELLES' CONCRETE.

Architects' Designs are carried out with the greatest care.

CONSERVATORIES,
GREENHOUSES,
WOODEN BUILDINGS,
Bank, Office, & Shop Fittings.
CHURCH BENCHES & PULPITS.

ESTIMATES GIVEN ON APPLICATION.

DOULTING STONE.

CHARLES TRASK & SONS,

DOULTING, SHEPTON-MALLET

London Agent:

E. A. WILLIAMS, 16, Craven-st., Strand, W.C.

THE BATH STONE FIRMS, Ltd.

BATH,

FOR ALL THE PROVED KINDS OF BATH STONE.

FLUATE, for Hardening and Preserving Calcareous Stones and Marbles.

BAM HILL STONE.

The attention of Architects is specially invited to the durability and beautiful COLOUR of this material. Quarries well opened. Quick despatch guaranteed. Stonework delivered and fixed complete. Samples and estimates free. Address, The Ham Hill Stone Co., Norton, Stoke-under-Ham, Somerset. London Agent: Mr. E. A. Williams, 16, Craven-st., Strand, W.C. [ADV.

CRAIGLEITH STONE.

UNEQUALLED for Staircases, Steps, and Landings, especially for Public Buildings with great wear. VERY HARD, and NEVER WEARS SLIPPERY.

SOLE AGENTS for England,

J. & A. CREW, Cumberland Market, London, N.W.

Asphalte.—The Seyssel and Metallic Lake Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co. [ADV.

SPRAGUE & CO.,

STATIONERS, &c.,

Keep a Special Stock of Sundries for Professional Offices.

4 & 5, East Harding-st., Fetter-lane, E.C. [ADV.

QUANTITIES, &c., LITHOGRAPHED accurately and with despatch.

METCHIM & SON, 20, Parliament-st., S.W.

"QUANTITY SURVEYORS' TABLES AND DIARY" For 1894, price 6d. post 7d. In leather 1/- Post 1/1 [ADV.

STEAM ROAD ROLLERS ON HIRE

6 tons, 10 tons, 12 tons, 13 tons.

Also One-Horse and Two-Horse Rollers for Lawn Tennis and Cricket Grounds, &c.—Apply to THOMAS ADAMS, Contractor, Green Lane Goods Station, G.E.R. Wood Green, London, N.

SLATES. SLATING. TILING

Roberts, Adlard, & Co.

47, EASTCHEAP, CITY.

SLATE SLAB WORKS.

EUREKA GREEN SLATES.

SOLE IMPORTER

W. DUFFY'S PATENT

IMMOVABLE ACME

WOOD BLOCK FLOORING

THE PERFECT FLOORING FOR ALL PURPOSES.

Seven Gold Medals, four Silver, two Bronze Medals, and Certificate of Sanitary Institute of Great Britain.

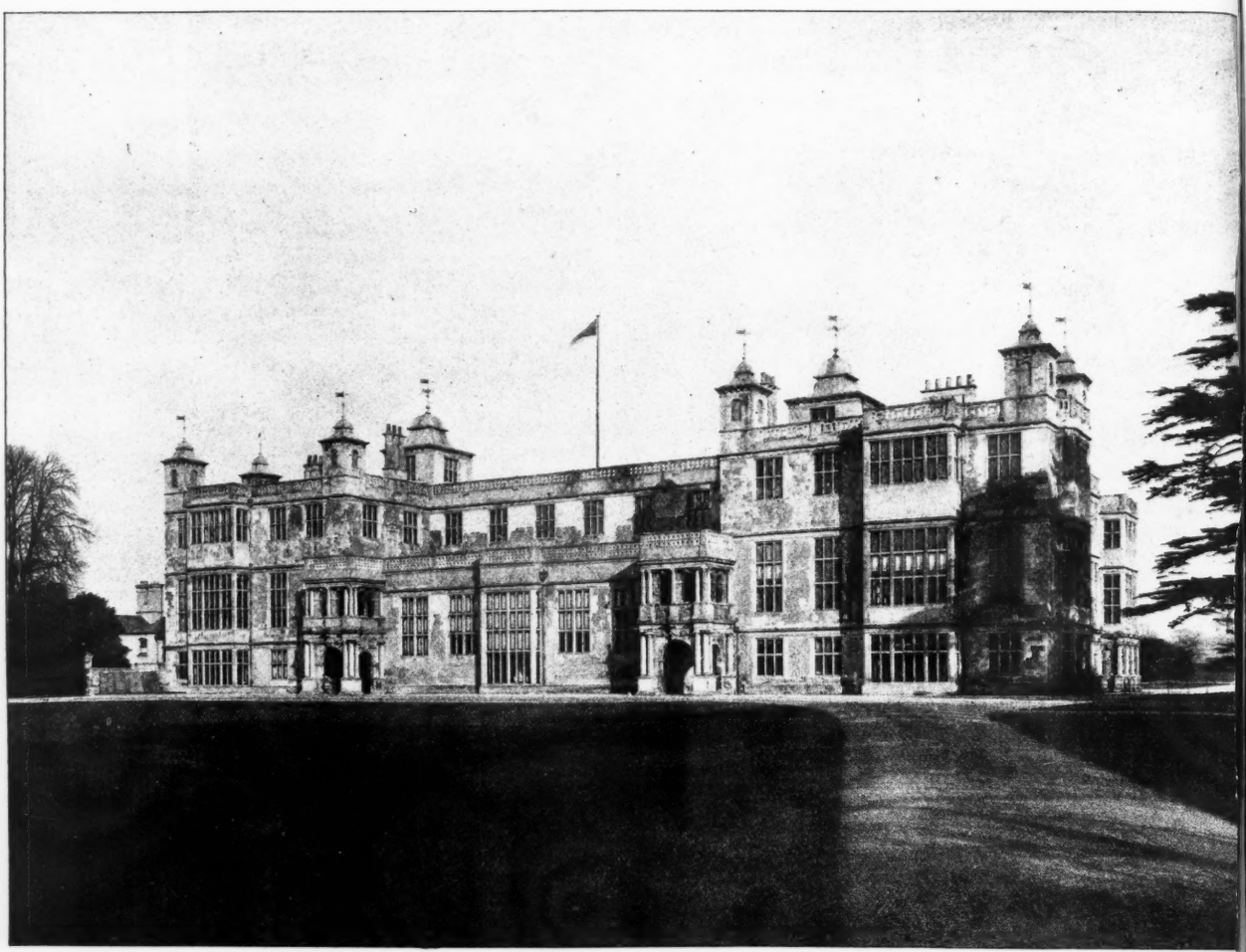
Full Particulars and Prices on application to

THE ACME WOOD FLOORING COMPANY, LTD.

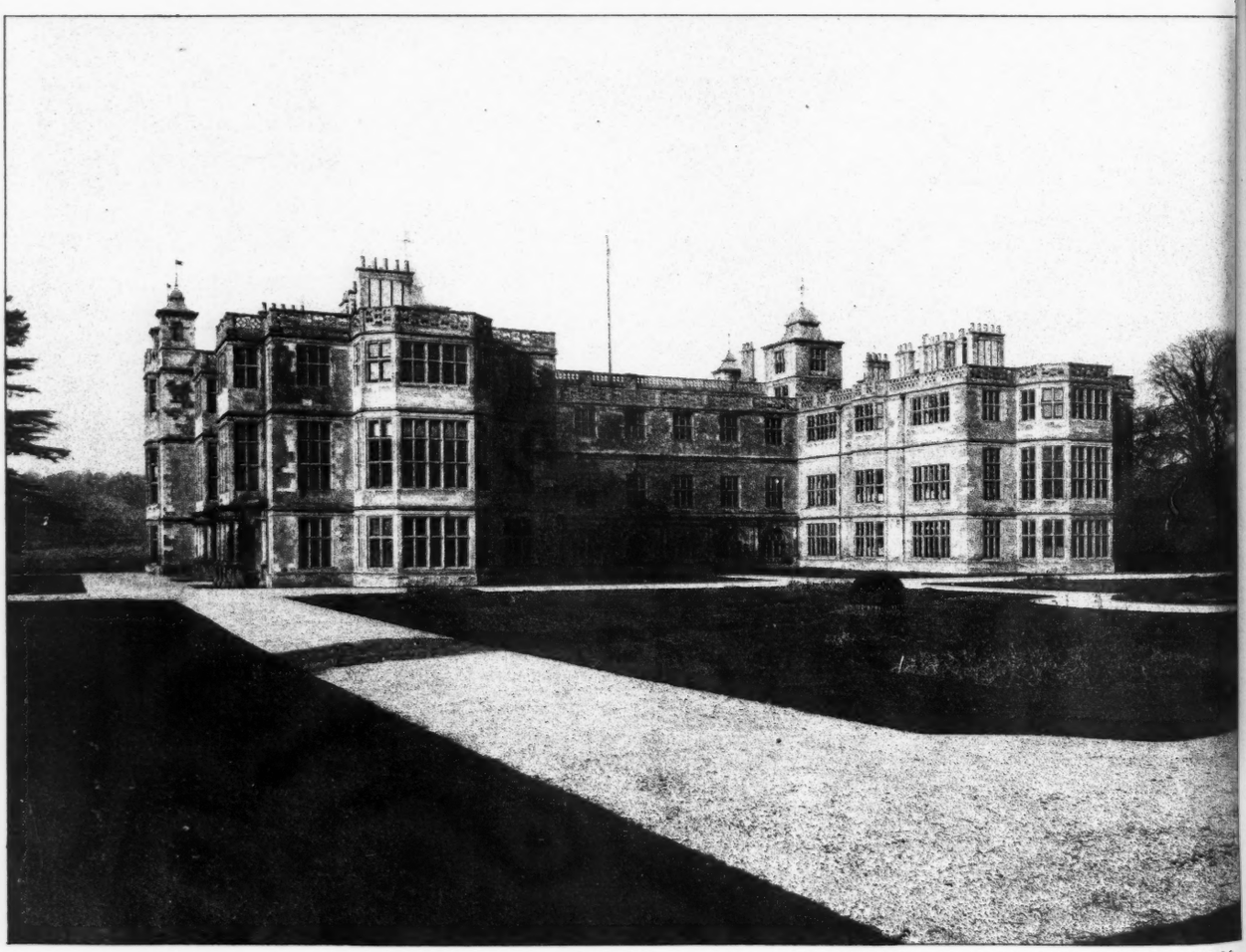
Chief Offices and Works: Vauxhall Walk and Glasshouse Street, London, S.E.

INA PHOTO SPRAGUE & Co 4 & 5 EAST HARDING STREET FETTER LANE E.C.

CHIMNEY-PIECE IN BALL ROOM, KNOLE HOUSE.



PRINCIPAL FRONT.



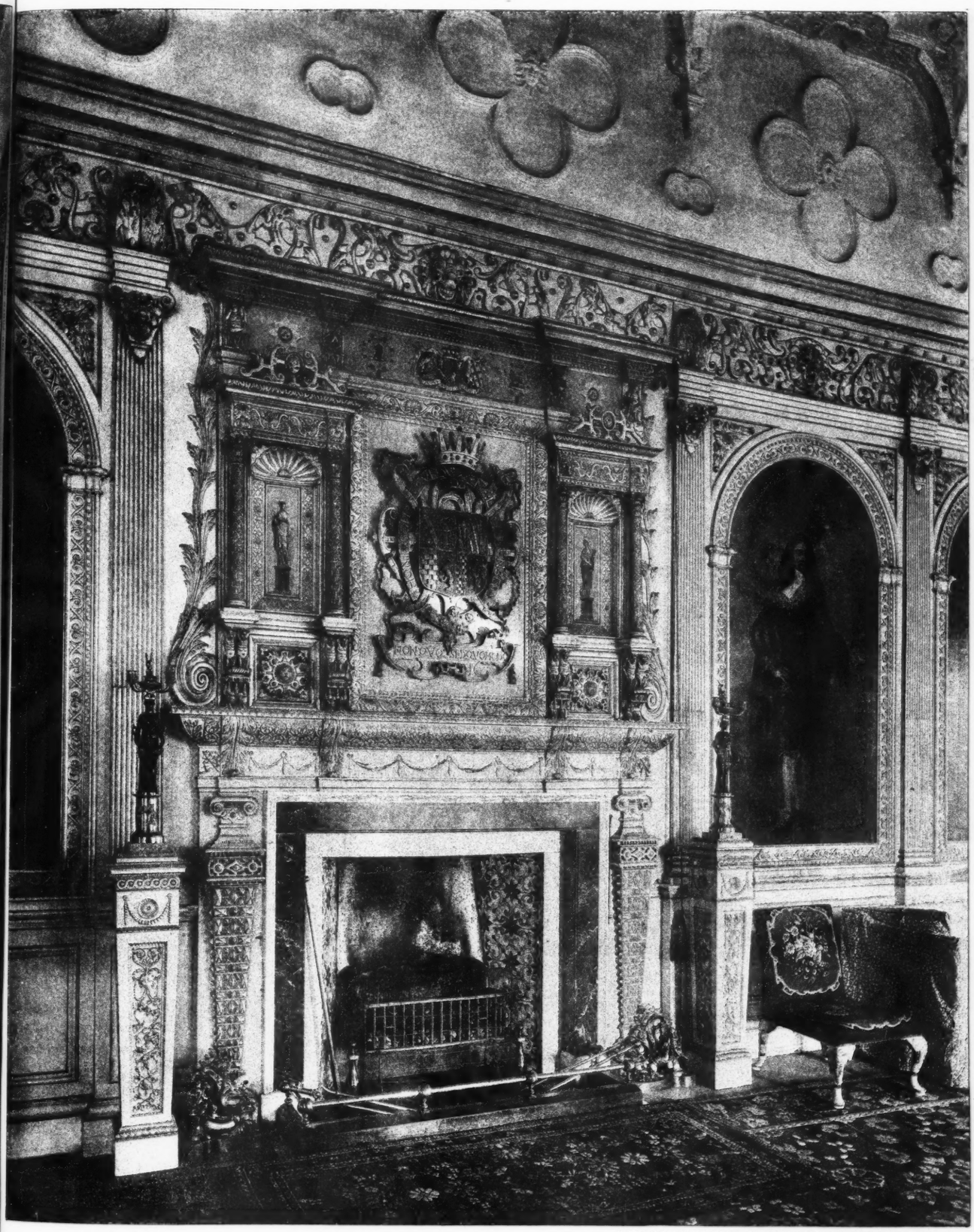
WEST FRONT.

INK-PHOTO SPRAGUE & Co. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

AUDLEY END

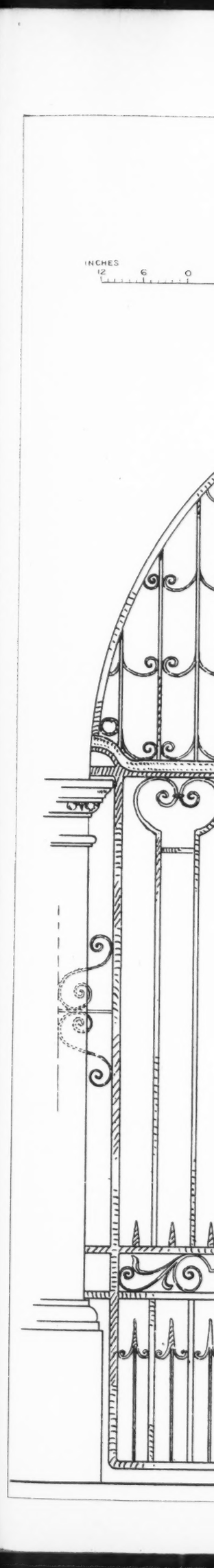
INK-PHOTO. SPRAGUE & Co. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

NORTH PORCH, AUDLEY END.



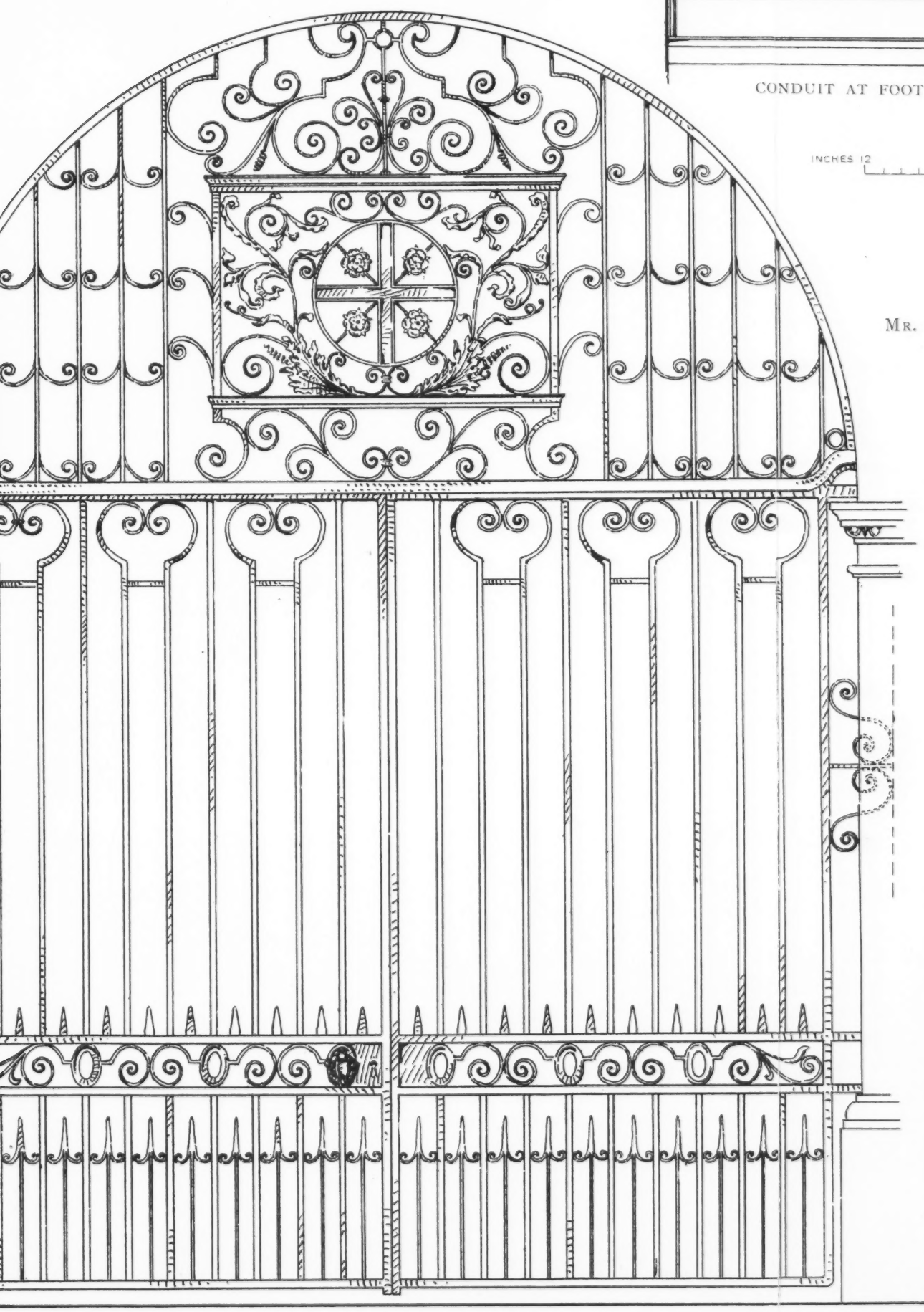
INK-PHOTO. SPRAGUE & Co. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

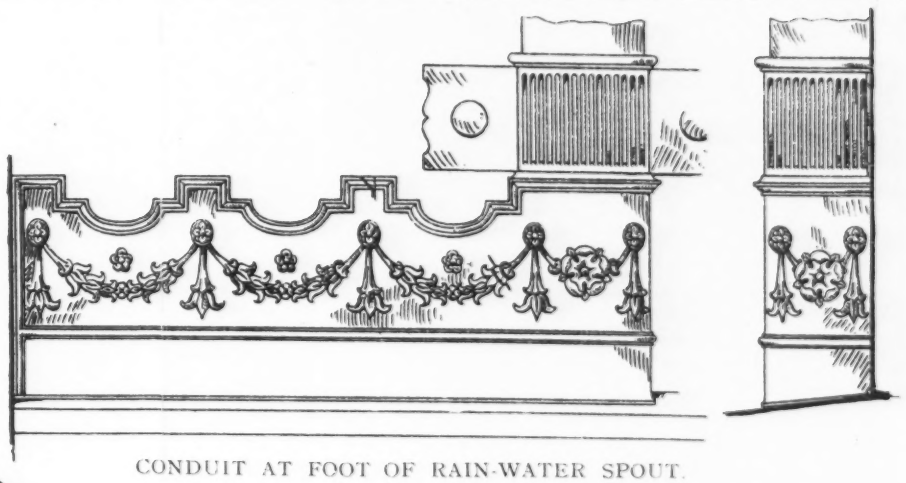
FIREPLACE, AUDLEY END.


INCHES
12
6
0

GATES TO MAIN ENTRANCE

FEET 0 1 2 3 4 5





CONDUIT AT FOOT OF RAIN-WATER SPOUT.

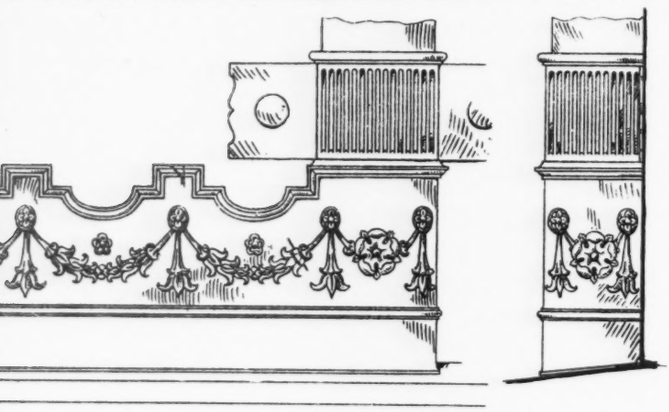
SCALE TO DETAILS

INCHES 12 6 0 1

DETAILS OF METAL WORK,
TULLIE HOUSE, CARLISLE

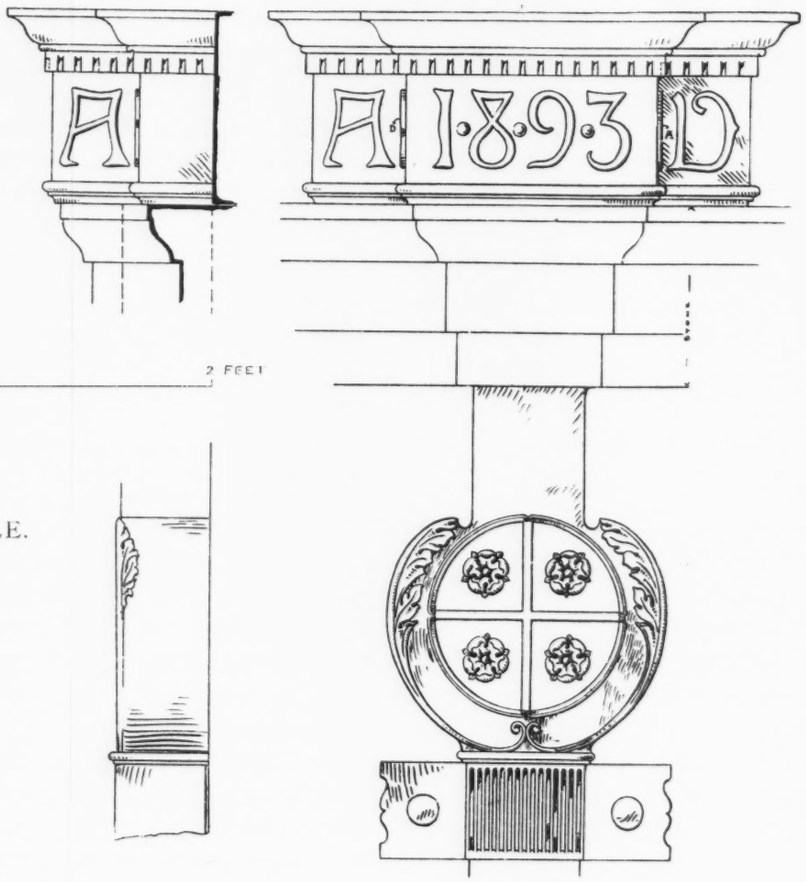
MR. C. J. FERGUSON, ARCHITECT.

DETAI



NDUIT AT FOOT OF RAIN-WATER SPOUT.

HEAD OF RAIN-WATER SPOUT
(LEAD)

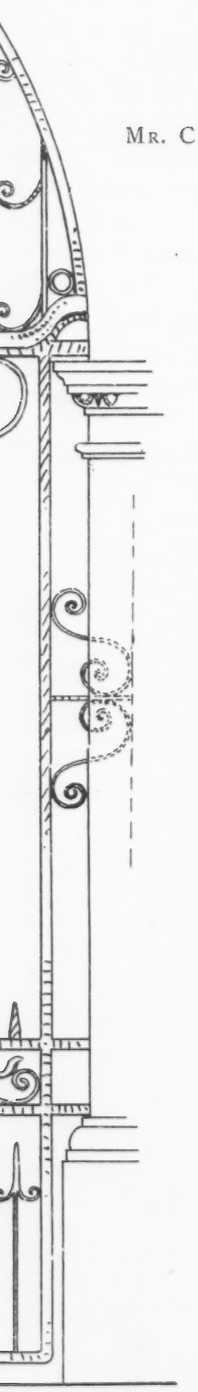


SCALE TO DETAILS

INCHES 12 6 0 1 2 FEET

DETAILS OF METAL WORK, TULLIE HOUSE, CARLISLE.

MR. C. J. FERGUSON, ARCHITECT.



DETAIL OF ORNAMENT IN HEAD OF GATE

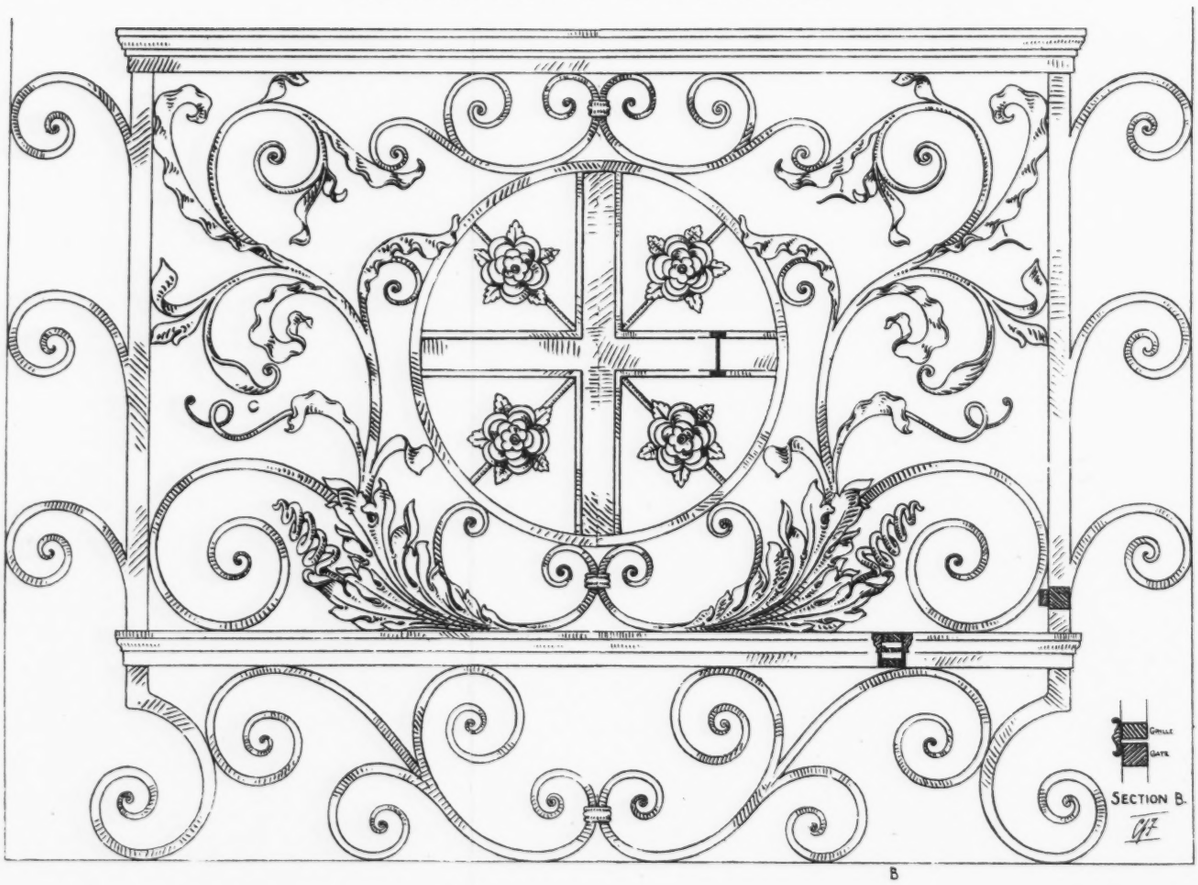
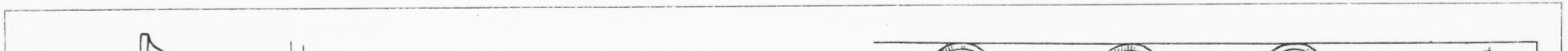



PHOTO-LITHO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.